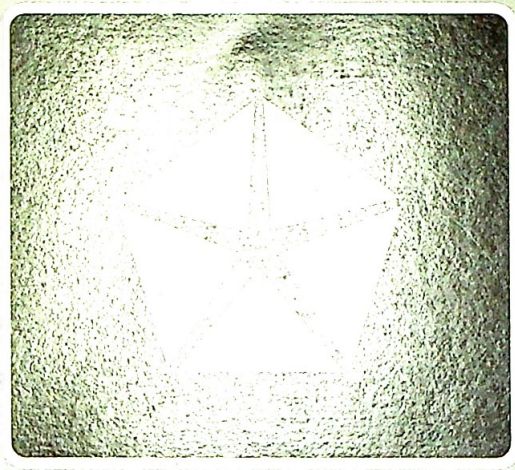


1999

Jeep® Cherokee



TRANSMISSION DIAGNOSTIC PROCEDURES

CAUTION

ALL SERVICE AND REBUILDING INSTRUCTIONS CONTAINED HEREIN ARE APPLICABLE TO, AND FOR THE CONVENIENCE OF, THE AUTOMOTIVE TRADE ONLY. All test and repair procedures on components or assemblies in non-automotive applications should be repaired in accordance with instructions supplied by the manufacturer of the total product.

Proper service and repair is important to the safe, reliable, operation of all motor vehicles. The service procedures recommended and described in this publication were developed for professional service personnel and are effective methods for performing vehicle repair. Following these procedures will help assure efficient economical vehicle performance and service reliability. Some of these service procedures require the use of special tools designed for specific procedures. These special tools should be used when recommended throughout this publication.

Special attention should be exercised when working with spring or tension loaded fasteners and devices such as E-Clips, Circlips, Snap rings, etc., as careless removal may cause personal injury. Always wear safety goggles whenever working on vehicles or vehicle components.

It is important to note that this publication contains various **Cautions** and **Warnings**. These should be carefully read in order to minimize the risk of personal injury, or the possibility that improper service methods may damage the vehicle or render it unsafe. It is important to note that these **Cautions** and **Warnings** cover only the situations and procedures Chrysler Corporation has encountered and recommended. Chrysler Corporation could not possibly know, evaluate, and advise the service trade of all conceivable ways that service may be performed, or of the possible hazards of each. Consequently, Chrysler Corporation has not undertaken any such broad service review. Accordingly, anyone who uses a service procedure, or tool, that is not recommended in this publication must assure oneself thoroughly that neither personal safety, nor vehicle safety, be jeopardized by the service methods they select.

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NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

1.0 INTRODUCTION

The procedures contained in this manual include specifications, instructions, and graphics needed to diagnose the **AW4 AUTOMATIC TRANSMISSION**. The diagnostics in this manual are based on the failure condition or symptom being present at the time of diagnosis.

Please follow the recommendations below when choosing your diagnostic path.

1. First make sure the DRBIII® is communicating with the appropriate modules; ie., if the DRBIII® displays a "No Response" condition, you must diagnose this first before proceeding.
2. Read DTC's (diagnostic trouble codes) with the DRBIII®.
3. If no DTC's are present, identify the customer complaint.
4. Once the DTC or customer complaint is identified, locate the matching test in the Table of Contents and begin to diagnose the symptom.

All component location views are in Section 8.0. All connector pinouts are in Section 9.0. All system schematics are in section 10.0.

An * placed before the symptom description indicates a customer complaint.

When repairs are required, refer to the appropriate service manual for the proper removal and repair procedure.

Diagnostic procedures change every year. New diagnostic systems may be added; carryover systems may be enhanced. **READ THIS MANUAL BEFORE TRYING TO DIAGNOSE A VEHICLE CODE.** It is recommended that you review the entire manual to become familiar with all new and changed diagnostic procedures.

After using this book, if you have any comments or recommendations, please fill out the form at the back of the book and mail it back to us.

1.1 SIX-STEP TROUBLESHOOTING PROCEDURE

Diagnosis of the AW4 electronic transmission system is done in six basic steps:

- verification of complaint
- verification of any related symptoms
- symptom analysis
- problem isolation
- repair of isolated problem
- verification of proper operation

2.0 IDENTIFICATION OF SYSTEM

All 1999 Jeep Cherokees (XJ) vehicles equipped with a 4.0 liter engine and automatic transmission have an AW4 electronic transmission.

3.0 SYSTEM DESCRIPTION AND FUNCTIONAL OPERATION

3.1 GENERAL DESCRIPTION

The AW4 electronic transmission is a conventional transmission in that it uses hydraulically applied clutches to shift a planetary gear train. However, the electronic control system replaces many of the mechanical and hydraulic components used in conventional transmission valve bodies.

The AW4 transmission control system has improved significantly since it's introduction. The Park/Neutral switch was replaced by a Transmission Range Sensor (TRS). The Transmission Control Module (TCM) now has the ability to communicate with the Powertrain Control Module (PCM) via the CCD Bus. The TCM also has the ability to monitor transmission faults which could affect emissions. Any transmission fault which will adversely affect emissions will set a DTC in the PCM and will also illuminate the MIL.

An Input Speed Sensor (ISS) was added to the control system. This gives improved functional trouble detection. This results in a new Diagnostic Trouble Code (DTC) to detect ISS malfunctions. The "Solenoid A or TCC Solenoid Functional Fault" DTC was separated into two DTC's "Shift solenoid A functional fault" and "TCC solenoid C functional fault" and there was also a new DTC for internal TCM failures.

3.2 FUNCTIONAL OPERATION

The AW4 system performs it's functions based on continuous real-time sensor feedback information. The Transmission Control Module (TCM) continuously checks for electrical problems, some mechanical problems, and some hydraulic problems. When a problem is sensed, the TCM stores a diagnostic trouble code. Some of these codes cause the transmission to go into "limp-in" or "default" mode. While in this mode, the TCM may not energize some of the solenoids in the transmission.

The only transmission functions that may be available are:

- Park and Neutral
- Reverse

GENERAL INFORMATION

- Fourth Gear (Gear Selector OD Position)
- Third Gear (Gear Selector 3 Position)
- First Gear (Gear Selector 1-2 Position)

Depending on the DTC that is set, determines what gear(s) are allowed. If one or more of the transmission solenoids are shorted to voltage or stuck open (therefore appearing energized to the transmission), the transmission may be stuck in the gear that would normally be engaged when a particular solenoid is energized.

The following chart shows the solenoid status required for a particular gear to be engaged.

<u>Sol #A</u>	<u>Sol #B</u>	<u>Gear</u>
Off	On	1st
On	On	2nd
On	Off	3rd
Off	Off	4th

Although vehicle performance may be seriously degraded while in this mode (limp-in), it allows the owner to drive the vehicle in for service.

3.3 DIAGNOSTIC TROUBLE CODES (DTC'S)

Always begin diagnosis by performing a visual inspection,

- check the fluid level and condition and correct as necessary
- check and adjust manual linkage as necessary
- check the electrical connections at the PCM, TCM, TPS, TRS and Transmission solenoid for pushed out or corroded terminals. Make sure all connectors are seated properly.
- test drive the vehicle to verify the customer complaint
- read the DTC's, the DTC will direct you to the specific test(s) in the table of contents that must be performed. If more than one code exists, diagnostic priority should be given to the most recent code.

If there is a CCD bus bias or communication problem, trouble codes will not be accessible until the problem is repaired. The DRBIII® will display an appropriate diagnostic message.

The following is a possible list of causes for a bus problem:

- open in either or both CCD bus wires.
- short to ground on either or both CCD bus wires.
- short to battery on either or both CCD bus wires.
- internal failure of any module or component on the bus

NOTE: THE CCD BUS SHOULD HAVE APPROXIMATELY 2.5 VOLTS ON BOTH WIRES. FOR MORE DETAILED INFORMATION ABOUT DIAGNOSING CCD BUS PROBLEMS, REFER TO THE APPROPRIATE BODY DIAGNOSTIC SYMPTOM.

The P-code, P1698-No CCD messages from TCM has been added for 1999.

This is a powertrain symptom (PCM code) and is diagnosed in powertrain diagnostics symptoms.

Each diagnostic trouble code is diagnosed by following a testing sequence. The diagnostic test procedures contain step-by-step instructions for determining the cause of a transmission diagnostic trouble code. Possible sources of the code are checked and eliminated one by one. It is not necessary to perform all of the tests in this book to diagnose an individual code. In certain test procedures within this book, codes are used as a diagnostic tool.

DTC's which affect vehicle emissions will illuminate the Malfunction Indicator Lamp (MIL). Three consecutive "Good" OBDII trips or clearing the DTC's with a diagnostic tool (DRBIII® or equivalent) is required to extinguish the MIL.

3.3.1 HARD CODE

Any Diagnostic trouble codes (or **One-Trip** failure or drive cycle) that comes back within one cycle of the ignition key is a "hard" code. This means that the problem is there every time the TCM checks that circuit or function.

NOTE: OBDII CODES WILL NOT SET WITH JUST THE IGNITION KEY ON. THEY MUST BE DRIVEN, IN THE VEHICLE START AND DRIVE CYCLE(S) SUCH THAT ALL DIAGNOSTIC MONITORS HAVE RUN.

3.3.2 INTERMITTENT CODE

A diagnostic trouble code that is not present every time the TCM checks the circuit or function is an "intermittent" code. Problems that come and go like this are the most difficult to diagnose, they must be looked for under the specific conditions that cause them.

3.3.3 STARTS SINCE SET COUNTER

For the most recent code (Code 1), the starts since set counter count the number of times the vehicle has started since it was last set. The starts since set counter will count up to 255 starts. When there are no diagnostic trouble codes stored in memory, the DRBIII® will display "NO DTC's DETECTED".

If DTC's are detected, the DRBIII® will display the number of good trips. This is the number of good trips since the latest DTC was set. The number of

good trips helps determine if the diagnostic trouble code is hard or intermittent.

- If the Good Trip count is displayed and equal to 0, the code is a hard code.

Note: Look at "One-Trip" codes as a Hard codes.

- If the code is in the Warm-Up Cycle counter, it is considered an intermittent code. This means that the vehicle (transmission) has been driven at least "3 Good Trips" without the code recurring.

3.3.4 TROUBLE CODE ERASURE

A Diagnostic trouble code will be cleared from TCM memory if 40 Warm-Up Cycles have occurred. A warm-up cycle is defined by CARB as "sufficient vehicle operation such that the coolant temperature has risen by at least 40°F from engine starting and reaches a minimum temperature of 160°F".

The Malfunction Indicator Lamp (MIL) will turn off after 3 good trips. The MIL will also turn off if the DTC's are cleared from the TCM with the diagnostic scan tool or if the problem corrects itself.

3.3.5 LIST OF DIAGNOSTIC TROUBLE CODES

The TCM may report any of the following DTC's.

Scan	Name of Code
P0122	THROTTLE POSITION SENSOR SIGNAL CIRCUIT
P0562	TRANSMISSION VOLTAGE LOW
P0563	TRANSMISSION VOLTAGE HIGH
P0705	CHECK SHIFTER SIGNAL (RANGE SENSOR)
P0715	INPUT SPEED SENSOR
P0720	OUTPUT SPEED SENSOR
P0740	(TCC) SOLENOID C FUNCTIONAL FAULT
P0751	SOLENOID A FUNCTIONAL FAULT
P0756	SOLENOID B FUNCTIONAL FAULT
P1694	NO CCD MESSAGE FROM PCM
P1718	INTERNAL TCM
P1742	INTERNAL TCM
P1743	INTERNAL TCM
P1744	SOLENOID A SHORTED TO GROUND
P1745	SOLENOID A SHORTED TO VOLTAGE OR OPEN
P1746	SOLENOID B SHORTED TO GROUND
P1747	SOLENOID B SHORTED TO VOLTAGE OR OPEN
P1748	(TCC) SOLENOID C SHORTED TO GROUND

P1749 (TCC) SOLENOID C SHORTED TO VOLTAGE OR OPEN

The P-codes, P1698-" No CCD messages from TCM" and P0700 "Transmission Fault Present" are Powertrain Symptoms (PCM codes) and are diagnosed under the powertrain diagnostic symptoms group.

DTC's for AW4 transmission controller are not permanent and will change the moment the reason for the code is corrected.

3.4 INPUT SPEED SENSOR

The TCM uses the Input Speed Sensor (ISS) to detect transmission solenoid functional faults (P0751 solenoid A functional fault, P0756 solenoid B functional fault, TCC solenoid C functional fault). The ISS is a variable reluctance sensor. Changes in the reluctance of a magnetic circuit caused by the passing of the rotor lobes on the overdrive clutch drum result in the ISS outputting an AC periodic voltage wave form. The frequency and voltage of the wave form are proportional to the transmission input speed.

NOTE: SINCE THE OD/CLUTCH DRUM IS STATIONARY IN 4TH GEAR OR WHEN THE VEHICLE IS IN GEAR, BUT NOT MOVING. THERE WILL BE NO ISS SENSOR SIGNAL.

3.5 OUTPUT SPEED SENSOR

The Transmission Control Module (TCM) uses the Output Speed Sensor (OSS) to determine shift points and TCC engagement points. The OSS is a variable reluctance sensor. Changes in the reluctance of a magnetic circuit caused by the passing of the rotor lobes on the output shaft result in the OSS outputting an AC periodic voltage wave form. The frequency and voltage of the wave form are proportional to the transmission output shaft speed.

3.6 TRANSMISSION RANGE SENSOR

The transmission range sensor (TRS) contacts are used to determine the position of the shift lever and also to control the reverse lamps. The TCM determines the shift lever position based on the table below.

Shift lever position	Range Switch states			
	R	D	D3	L
P	off	off	off	off
R	on	off	off	off
N	off	off	off	off
OD	off	on	off	off
3	off	off	on	off
1-2	off	off	off	on

GENERAL INFORMATION

There are five switches in the TRS, 1 each for the 1-2, 3, OD, Reverse and Park/Neutral. The Park/Neutral portion of the TRS is hard wired to the Powertrain Control Module (PCM). The Park/Neutral information is received by the TCM from the PCM over the CCD communication bus. 12 volts is supplied to the TRS through the fused ignition switch output circuit. The TCM senses this voltage when a switch is closed. When the reverse switch is closed, power is supplied to the reverse lamps.

3.7 THROTTLE POSITION SENSOR

The TCM uses the Throttle Position Sensor (TPS) signal to determine shift points. The TPS circuit is hard wired to the TCM. If Pcode **P0122 "Throttle Position Sensor circuit"** is present, there may be a TPS code stored in the PCM. Always repair the PCM throttle position sensor DTC's first.

3.8 TRANSMISSION CONTROL MODULE SYSTEM

3.8.1 COMMUNICATIONS TO PCM

The PCM is continuously sending Bus Messages to the TCM. The TCM requires inputs from the PCM primarily to determine the Vehicle speed, Engine RPM, and the Park/Neutral switch state. The PCM also monitors the CCD bus messages from the TCM. A Diagnostic code is set if the TCM does not receive any valid messages from the PCM for 20 seconds.

3.8.2 OPERATING VOLTAGE

The TCM can operate normally with a battery voltage input between 10.0 and 17.7 volts. If the battery voltage supply (Fused B+) voltage is out of range there is a possibility of abnormal operation and/or TCM failure. A "Transmission Voltage High" or "Transmission Voltage Low" DTC will be set.

NOTE: ALWAYS PERFORM DIAGNOSTICS WITH A FULLY CHARGED BATTERY TO AVOID DIAGNOSING FALSE SYMPTOMS.

3.8.3 SHIFT SOLENOIDS

Two solenoids are used to control shifting. Solenoid A is used to control the 1-2 shift and the 3-4 shift. Solenoid B is used to control the 2-3 shift. Solenoid C controls the operation of the Torque Converter Clutch (TCC). The TCC solenoid is controlled by the TCM. The TCC can be engaged in 2nd, 3rd and fourth gear. The TCC can not be engaged in 1st gear, because it is hydraulically

locked out in 1st gear. If the TCM turns off the solenoids and a voltage is detected on the control circuit a DTC will be set.

3.8.4 FUNCTIONAL FAULTS

Functional faults are detected by the transmission control module. The TCM uses the output speed sensor and the input speed sensor to calculate the current gear ratio. If the gear ratio is not within tolerance (within 10%) for the correct gear detected, a DTC will be set. The TCC solenoid functional fault will set if the difference between engine RPM and transmission input RPM is not consistent with the requested TCC state.

3.9 USING THE DRBIII®

The TCM and other components have the ability to interface over the communications bus. The DRB® Scan Tool connects to the Data Link Connector located in the passenger compartment. This allows communication with the TCM.

Refer to the DRBIII® user's guide for instructions and assistance with reading trouble codes, erasing trouble codes, and other DRBIII® functions.

3.9.1 DRBIII® ERROR MESSAGES

Under normal operation, the DRBIII® will display one of only two error messages:

- User-Requested WARM Boot
- User-Requested COLD Boot

If the DRBIII® should display any other error message, record the entire display and call the MDS Hotline. This is a **Sample** of such an error message display:

```
ver: 2.14
date: 26 Jul93
file: key_itf.cc
date: Jul 26 1998
line: 548
err: 0x1
User-Requested COLD Boot
```

Press MORE to switch between this display and the application screen.
Press F4 when done noting information.

3.9.2 DRBIII DOES NOT POWER UP (BLANK SCREEN)

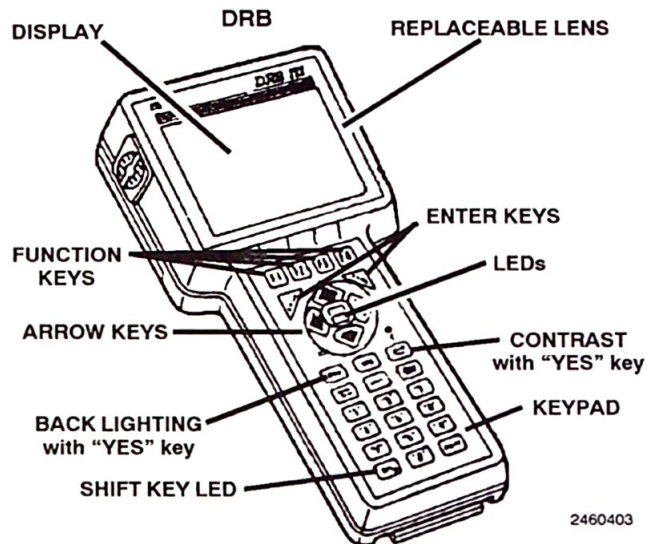
If the LED's do not light or no sound is emitted at start up, check for loose cable connections or a bad cable. Check the vehicle battery voltage. A minimum of 11 volts is required to adequately power the DRBIII®.

If all connections are proper between the DRBIII® and the vehicle or other devices, and the

vehicle battery is fully charged, an inoperative DRBIII® may be the result of a faulty cable or vehicle wiring. For a blank screen, refer to the 1999 XJ Body Diagnostic symptoms.

3.9.3 DISPLAY IS NOT VISIBLE

Low temperatures will affect the visibility of the display. Adjust the contrast to compensate for this condition.



4.0 DISCLAIMERS, SAFETY, WARNINGS

4.1 DISCLAIMERS

All information, illustrations and specifications contained in this manual are based on the latest information at the time of publication. The right is reserved to make changes at any time without notice.

4.2 SAFETY

4.2.1 TECHNICIAN SAFETY INFORMATION

WARNING: ENGINES PRODUCE CARBON MONOXIDE THAT IS ODORLESS, CAUSES SLOWER REACTION TIMES AND CAN LEAD TO SERIOUS INJURY. WHEN THE ENGINE IS OPERATING, KEEP SERVICE AREAS WELL VENTILATED OR ATTACH THE VEHICLE EXHAUST SYSTEM TO THE SHOP EXHAUST REMOVAL SYSTEM.

Some operations in this manual require that hydraulic tubes, hoses, and fittings, to be disconnected for inspection or testing purposes. These systems, when fully charged, contains fluid at high

pressure. Before disconnecting any hydraulic tubes, hoses or fittings, be sure that the system is fully de-pressurized.

When servicing a vehicle, always wear eye protection and remove any metal jewelry such as watchbands or bracelets that might make an inadvertent electrical contact.

When diagnosing a transmission system problem, it is important to follow approved procedures where applicable. Following these procedures is very important to the safety of individuals performing diagnostic tests.

4.2.2 VEHICLE PREPARATION FOR TESTING

Make sure the vehicle being tested has a fully charged battery. If it does not, false diagnostic codes or error messages may occur. It is extremely important that accurate shift lever position data be available to the TCM. The accuracy of any diagnostic trouble code found in memory is doubtful unless the Shift Lever Test, performed on the DRB® Scan Tool, passes without fail.

4.2.3 SERVICING SUB-ASSEMBLIES

Some components of the powertrain system are intended to be serviced in assembly only. Attempting to remove or repair certain system sub-components may result in personal injury and/or improper system operation. Only those components with approved repair and installation procedures in the service manual should be serviced.

4.2.4 DRBIII® SAFETY INFORMATION

WARNING: EXCEEDING THE LIMITS OF THE DRB® MULTIMETER IS DANGEROUS. IT CAN EXPOSE YOU TO SERIOUS OR POSSIBLY FATAL INJURY. CAREFULLY READ AND UNDERSTAND THE CAUTIONS AND THE SPECIFICATION LIMITS.

- Follow the vehicle manufacture's service specifications at all times.
- Do not use the DRB® if it has been damaged.
- Do not use the test leads if the insulation is damaged or if metal is exposed.
- To avoid electrical shock, do not touch the test leads, tips, or the circuit being tested.
- Choose the proper range and function for the measurement. Do not try voltage or current measurements that may exceed the rated capacity.
- Do not exceed the limits shown in the table.

GENERAL INFORMATION

FUNCTION	INPUT LIMIT
Volts	0 - 500 peak volts AC 0 - 500 volts DC
Ohms (resistance)*	0 - 1.12 megohms
Frequency Measured Frequency Generated	0 - 10 kHz
Temperature	-58 - 1100°F -50 - 600°C

* Ohms cannot be measured if voltage is present. Ohms can be measured only in a non-powered circuit.

- Voltage between any terminal and ground must not exceed 500v DC or 500v peak AC.
- Use caution when measuring voltage above 25v DC or 25v AC.
- The circuit being tested must be protected by a 10A. fuse or circuit breaker.
- Use the low current shunt to measure circuits up to 10A. Use the high current clamp to measure circuits exceeding 10A.
- When testing for the presence of voltage or current, make sure the meter is functioning correctly. Take a reading of a known voltage or current before accepting a zero reading.
- When measuring current, connect the meter in series with the load.
- Disconnect the live test lead before disconnecting the common test lead.
- When using the meter function, keep the DRB® away from spark plug or coil wires to avoid measuring error from outside interference.

4.3 WARNINGS

4.3.1 VEHICLE DAMAGE WARNINGS

Before disconnecting any control module, make sure the ignition is "off". Failure to do so could damage the module.

When testing voltage or continuity at any control module, use the terminal side (not the wire end) of the connector. Do not probe a wire through the insulation; this will damage it and eventually cause it to fail because of corrosion.

Be careful when performing electrical tests so as to prevent accidental shorting of terminals. Such mistakes can damage fuses or components. Also, a second code could be set, making diagnosis of the original problem more difficult.

4.3.2 ROAD TEST COMPLAINT VEHICLE

Some complaints will require a test drive as part of the repair verification procedure. The purpose of the test drive is to try to duplicate the diagnostic code or symptom.

CAUTION: BEFORE ROAD TESTING A VEHICLE, BE SURE THAT ALL COMPONENTS ARE REASSEMBLED. DURING THE TEST DRIVE, DO NOT TRY TO READ THE DRB® SCREEN WHILE IN MOTION. DO NOT HANG THE DRB® FROM THE REAR VIEW MIRROR OR OPERATE IT YOURSELF. HAVE AN ASSISTANT AVAILABLE TO OPERATE THE DRB®.

Road testing is an essential step in the diagnostic process that must not be overlooked. Along with diagnostic information obtained from the DRB® Scan Tool and the original customer concern, the road test helps to verify the problem and observe operation under actual vehicle driving conditions.

Just as important as the road test is, there are preliminary inspections that should be carried out prior to the road test. Always check the fluid level and condition before going on a road test or performing other tests. Also try to determine the type of fluid being used. Improper fluid can result in problems. Additionally, a variety of complaints can be caused by incorrect fluid level. Some of the conditions caused by incorrect fluid level are as follows:

- Delayed engagement
- Poor shifting or erratic shifts
- Excessive noise
- Overheating

The next step is to verify that the shift linkage is correctly adjusted. If the gearshift linkage is incorrectly adjusted because of wear or incorrect adjustment, a number of complaints can result.

The TCM monitors the Transmission Range (TRS) Sensor at all times. If the linkage is incorrectly adjusted, the TCM may sense a shift lever position that is not correct for the gear range chosen by the driver. This may cause diagnostic trouble codes to be set and a possible limp-in situation.

The following complaints may also be the result of an incorrectly adjusted or worn linkage:

- Delayed clutch engagement or erratic shifts
- Vehicle able to drive in Neutral
- Engine not able to crank in Park or Neutral
- Gearshift linkage able to be shifted without the key in the ignition
- Not able to remove the ignition key in Reverse
- Parking pawl not engaging

The shift linkage should also be adjusted when replacing the transmission, repairing the valve body or repairing any component between the shift lever and the transmission.

Some questions to ask yourself when considering the road test are listed below:

- Is the complaint or concern what you think it is, based on the driver's description of the problem?
- Is the transmission operating normally, or is there a real problem?
- When does the malfunction occur?
- Is the problem in only one gear range?
- What temperature does the complaint occur?
- Is the transmission in limp-in mode?

4.3.3 BULLETINS AND RECALLS

The service procedures contained in this manual are correct, provided that all applicable Safety Recalls and Technical Service Bulletins have been performed. Perform a Dial Function 70 to retrieve a recall history for the vehicle being serviced.

5.0 REQUIRED TOOLS AND EQUIPMENT

- > DRBIII® (diagnostic read-out box) - DRBIII® must use the most current software release level.
- > Jumper wires
- > Ohmmeter
- > Voltmeter

6.0 GLOSSARY OF TERMS

6.1 ACRONYMS

BCM	Body Control Module
CARB	California Air Resource Board
CCD	Chrysler Collision Detection (communication bus)
CKT	Circuit
DLC	Data Link Connector
CVI	Clutch Volume Index
DLC	Data Link Connector
DRBIII®	Diagnostic Readout Box
DTC	Diagnostic Trouble Code
IOD	Ignition off-draw
ISS	Input Speed Sensor
LED	Light Emitting Diode

L-R	Low/reverse Clutch
LU	Lockup
MIL	Malfunction Indicator Lamp
OD	Overdrive
OSS	Output Speed Sensor
PCM	Powertrain Control Module
REV	Reverse
SW	Switch
TCC	Torque Converter Clutch
TCM	Transmission Control Module
TPS	Throttle Position Sensor
TRS	Transmission Range Sensor
UD	Underdrive
VSS	Vehicle Speed Sensor

6.2 DEFINITIONS

OBDII Trip - A vehicle start and drive cycle such that all once per trip diagnostic monitors have run.

Key Start - A vehicle start and run cycle of at least 20 seconds.

Warm-up Cycle - A vehicle start and run cycle such that the engine coolant must rise to at least 160°F and must rise by at least 40°F from initial start up. To count as a warm-up cycle, no faults may occur during the cycle.

NOTES

[illegible]

7.0

DIAGNOSTIC INFORMATION AND PROCEDURES

TRANSMISSION

Symptom:

ENTERING DIAGNOSTIC TESTS

POSSIBLE CAUSES
TRANSMISSION SLIPS IN REVERSE
MANUAL LINKAGE OUT OF ADJUSTMENT
TPS DEFECTIVE
BRAKE PEDAL / LINKAGE BIND
BRAKE SW SENSE CKT OPEN
BRAKE SWITCH - CONTACTS OPEN
BRAKE SWITCH GROUND CKT OPEN
BRAKE SWITCH SENSE CIRCUIT SHORTED TO GROUND
BRAKE SWITCH SHORTED
ENTERING DIAGNOSTIC TESTS
TCM- BRAKE SW SENSE SUPPLY OPEN
TCM- BRAKE SWITCH SENSE SHORTED
TCM- NO RESPONSE TO BRAKE SWITCH

ENTERING DIAGNOSTIC TESTS — Continued

TEST	ACTION	APPLICABILITY
1	<p>Test drive vehicle to verify customer complaint.</p> <p>Check fluid level - With Transmission at normal operating temperature, check and adjust fluid level as necessary. If fluid level was excessively low or high, test drive vehicle to verify symptom / condition is still present.</p> <p>Check fluid condition - If the fluid smells burned and / or is contaminated with metal or friction particles, a complete overhaul is necessary.</p> <p>Manual linkage - Check and adjust manual linkage as necessary per service manual instructions. If adjustment was necessary, test drive vehicle to verify symptom / condition is still present.</p> <p>Electrical connections - Carefully inspect the following for pushed out terminals, connectors fully seated, cut wires: TCM Connector, TPS Connector, Transmission 8-way Solenoid Connector, Transmission 8-way TRS Connector, PCM Powertrain Connectors.</p> <p>If repairs are made, test drive vehicle to verify symptom / condition is still present.</p> <p>Connect a Battery Charger to the vehicle to ensure that the Battery remains fully charged during the remainder of testing.</p> <p>Connect the DRBIII to the 16-way Data Link Connector (DLC).</p> <p>With the DRB, read Diagnostic Trouble Codes (DTC's) from the Transmission Control Module (TCM).</p> <p>Were any DTC's stored in the Transmission Control Module (TCM)?</p> <p>Yes → Refer to Symptoms List for problems related to Transmission. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 2</p> <p>If the DRB displays NO RESPONSE FROM TRANSMISSION CONTROL MODULE or if there is a Bus Failure Message, refer to Symptoms - Possible Causes for Vehicle Communications diagnostics.</p>	All
2	<p>Turn Key On, Engine Off.</p> <p>Place Gear Select Lever in Park.</p> <p>With DRB, monitor Shift Lever Position.</p> <p>Move the Shift Lever from Park to 1-2, pausing in each gear position to observe DRB display.</p> <p>Does the DRB display match the Gear Select position in all positions?</p> <p>Yes → Go To 3</p> <p>No → Adjust Manual Linkage per Service Manual instructions. Perform Transmission Verification Test VER-1A</p>	All
3	<p>Turn Key On, Engine Off.</p> <p>With DRB, monitor Throttle Position Sensor voltage.</p> <p>Slowly depress the Throttle while observing the DRB display.</p> <p>Does the TPS voltage change smoothly while depressing the Throttle.</p> <p>Yes → Go To 4</p> <p>No → Replace Throttle Position Sensor. Perform Transmission Verification Test VER-1A</p>	All
4	<p>Test drive vehicle.</p> <p>Accelerate to 55 MPH using light throttle.</p> <p>Maintain 55 MPH for at least 30 seconds.</p> <p>Note shift patterns and TCC operation.</p> <p>Does the Transmission shift smoothly through all 4 forward gears?</p> <p>Yes → Go To 5</p> <p>No → Go To 16</p>	All

TRANSMISSION

ENTERING DIAGNOSTIC TESTS — Continued

TEST	ACTION	APPLICABILITY
5	<p>Does the Torque Converter Clutch engage and disengage properly?</p> <p>Yes → Go To 6</p> <p>No → Go To 7</p>	All
6	<p>Does the Transmission slip while in Reverse?</p> <p>Yes → Repair internal Transmission problem as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All
7	<p>With DRB, monitor Brake Switch status. Depress the Brake Pedal. Does the Brake Switch status indicate ON?</p> <p>Yes → Go To 8</p> <p>No → Go To 14</p>	All
8	<p>With DRB, monitor Brake Switch status. Release the Brake Pedal. Does the Brake Switch status indicate ON?</p> <p>Yes → Go To 9</p> <p>No → Refer to symptom P0740 TCC SOLENOID C FUNCTIONAL FAULT.</p>	All
9	<p>With DRB, monitor Brake Switch status. While still monitoring Brake Switch status, lift up on Brake Pedal. Does the Brake Switch status indicate ON?</p> <p>Yes → Go To 10</p> <p>No → Repair cause of Brake Pedal engaging Brake Switch when brakes are released. Perform Transmission Verification Test VER-1A</p>	All
10	<p>Disconnect the Brake Switch Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Ground Circuit in the connector and ground. Is the resistance below 5.0 ohms?</p> <p>Yes → Go To 11</p> <p>No → Repair open Ground Circuit. Perform Transmission Verification Test VER-1A</p>	All
11	<p>Disconnect the Brake Switch Connector. Check connectors - Clean / repair as necessary. Measure the voltage at the Brake Switch Sense Circuit. Is the voltage above 10.0 volts?</p> <p>Yes → Go To 12</p> <p>No → Go To 13</p>	All

ENTERING DIAGNOSTIC TESTS — Continued

TEST	ACTION	APPLICABILITY
12	<p>Disconnect the Brake Switch Connector. Check connectors - Clean / repair as necessary. Connect a jumper wire between the Brake Switch Sense Circuit and ground. With DRB, monitor Brake Switch status. Does the Brake Switch status indicate OFF?</p> <p>Yes → Replace the Brake Switch. Perform Transmission Verification Test VER-1A</p> <p>No → Replace the TCM. Perform Transmission Verification Test VER-1A</p>	All
13	<p>Turn Key Off. Disconnect the Brake Switch Connector. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the Brake Switch Sense Circuit between the Brake Switch Connector and the TCM Connector. Is the resistance below 5.0 ohms?</p> <p>Yes → Replace TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Repair open Brake Switch Sense Circuit between TCM and Brake Switch. Perform Transmission Verification Test VER-1A</p>	All
14	<p>Disconnect the Brake Switch Connector. Check connectors - Clean / repair as necessary. With DRB, monitor Brake Switch status. Does the Brake Switch status indicate ON?</p> <p>Yes → Replace Brake Switch. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 15</p>	All
15	<p>Turn Key Off. Disconnect the Brake Switch Connector. Disconnect the TCM. Check connectors - Clean / repair as necessary. Measure the resistance between the Brake Switch Sense Circuit and ground. Is the resistance below 5.0 ohms?</p> <p>Yes → Repair Brake Switch Sense Circuit shorted to ground between TCM and Brake Switch. Perform Transmission Verification Test VER-1A</p> <p>No → Replace the TCM. Perform Transmission Verification Test VER-1A</p>	All
16	<p>Does the Transmission only have 2nd and 3rd Gear?</p> <p>Yes → Refer to symptom P0751 SOLENOID A FUNCTIONAL FAULT.</p> <p>No → Go To 17</p>	All
17	<p>Does the Transmission only have 1st and 4th Gear?</p> <p>Yes → Refer to symptom P0751 SOLENOID A FUNCTIONAL FAULT.</p> <p>No → Refer to symptom P0756 SOLENOID B FUNCTIONAL FAULT.</p>	All

TRANSMISSION

Symptom:

P0122 THROTTLE POSITION SENSOR SIGNAL CIRCUIT

When Monitored and Set Condition:

P0122 THROTTLE POSITION SENSOR SIGNAL CIRCUIT

When Monitored: Continuously with Ignition Key On.

Set Condition: The Throttle Position Sensor Signal Circuit is out of range for 7 seconds or the Sensor Ground Circuit is open or shorted to voltage for 7 seconds.

POSSIBLE CAUSES
TPS DTC'S STORED IN POWER CONTROL MODULE
TPS SIGNAL CIRCUIT SHORT TO GROUND
TPS SIGNAL SHORT TO VOLT BETWEEN TPS AND TCM
TPS WIRING BETWEEN PCM & TCM DAMAGED
SENSOR GROUND CIRCUIT BETWEEN TPS AND TCM OPEN
TPS SIGNAL CIRCUIT OPEN BETWEEN TPS AND TCM
TPS VOLTAGE OUT OF RANGE
TPS SIGNAL CIRCUIT ON TCM DEFECTIVE

P0122 THROTTLE POSITION SENSOR SIGNAL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
18	<p>With DRB, read PCM DTC's. Are there any TPS related Trouble Codes stored in the PCM ?</p> <p>Yes → Perform appropriate Powertrain diagnostics.</p> <p>No → Go To 19</p>	All
19	<p>With DRB, read TPS voltage under TRANSMISSION SENSORS. Make sure the Throttle is all the way closed. Is the voltage between 0.5 and 1.5 volts ?</p> <p>Yes → Go To 20</p> <p>No → Go To 21</p>	All
20	<p>At this time the conditions to set this code are not present. Using the schematic as a guide, inspect the wiring and connectors. Were any problems found ?</p> <p>Yes → Repair as necessary.</p> <p>No → Test Complete.</p>	All
21	<p>With DRB, read TPS voltage under Transmission Sensors. Is the voltage between 1.5 volts and 4.8 volts ?</p> <p>Yes → Perform appropriate Thottle Position Sensor NTC Test in Powertrain section.</p> <p>No → Go To 22</p>	All
22	<p>With DRB, read TPS voltage under Transmission Sensors. Is the voltage above 4.8 volts ?</p> <p>Yes → Repair TPS Signal Circuit shorted to voltage between TPS and TCM.</p> <p>No → Go To 23</p>	All
23	<p>Turn Key Off. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TPS Signal Circuit and Ground. Is the resistance above 5.0 ohms ?</p> <p>Yes → Go To 24</p> <p>No → Repair TPS Signal Circuit shorted to ground.</p>	All
24	<p>Turn Key Off. Disconnect the TCM Connector. Disconnect TPS Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the TPS Signal Circuit between the TPS Connector and the TCM Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 25</p> <p>No → Repair open TPS Signal Circuit between TPS and TCM.</p>	All

TRANSMISSION

P0122 THROTTLE POSITION SENSOR SIGNAL CIRCUIT — Continued

TEST	ACTION	APPLICABILITY
25	Turn Key Off. Disconnect the TCM Connector. Disconnect TPS Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the Sensor Ground Circuit between the TPS Connector and the TCM Connector. Is the resistance below 5.0 ohms ? Yes → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A No → Repair open Sensor Ground Circuit between TPS and TCM.	All

Symptom:**P0562 TRANSMISSION VOLTAGE LOW****When Monitored and Set Condition:****P0562 TRANSMISSION VOLTAGE LOW**

When Monitored: Continuously with Key On.

Set Condition: The voltage on the Fused B(+) Circuit falls below 10.0 volts for 1 minute.

POSSIBLE CAUSES

PCM CHARGING SYSTEM DTC PRESENT

TCM DEFECTIVE- FUSED B(+) SUPPLY

BATTERY TO TCM WIRING DAMAGED

FUSED B(+) WIRING TO TCM DAMAGED

TRANSMISSION

P0562 TRANSMISSION VOLTAGE LOW — Continued

TEST	ACTION	APPLICABILITY
26	<p>With the DRB, read PCM DTC's. Are there any Charging System related Trouble Codes stored in the PCM?</p> <p>Yes → Refer to Symptoms - Possible Causes for Powertain diagnostics. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 27</p>	All
27	<p>With DRB, read Battery Voltage under Transmission Sensors. Increase Engine speed to 1500 RPM. Is the voltage above 9.9 volts?</p> <p>Yes → Go To 28</p> <p>No → Go To 29</p>	All
28	<p>Turn Key Off. At this time the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All
29	<p>Turn Key Off. Disconnect Transmission Control Module. Check connectors - Clean / repair as necessary. Measure the voltage at the Fused B(+) Circuit in the TCM Connector. Is the voltage above 9.9 volts?</p> <p>Yes → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 30</p>	All
30	<p>Turn Key Off. Disconnect Transmission Control Module. Check connectors - Clean / repair as necessary. With the DRB, read Battery Voltage from the Engine Sensor screen. Is the voltage above 9.9 volts?</p> <p>Yes → Repair Fused B(+) Circuit wiring and / or connectors. Perform Transmission Verification Test VER-1A</p> <p>No → Refer to symptom * CHARGING SYSTEM NO CODE.</p>	All

Symptom:**P0563 TRANSMISSION VOLTAGE HIGH****When Monitored and Set Condition:****P0563 TRANSMISSION VOLTAGE HIGH**

When Monitored: Continuously with Key On.

Set Condition: The voltage on the Fused B(+) Circuit goes above 17.5 volts for 1 minute.

POSSIBLE CAUSES

PCM CHARGING SYSTEM DTC PRESENT

TCM DEFECTIVE - FUSED B(+) SHORT

SUPPLY VOLTAGE WIRING TO TCM DAMAGED

TRANSMISSION

P0563 TRANSMISSION VOLTAGE HIGH — Continued

TEST	ACTION	APPLICABILITY
31	<p>With the DRB, read PCM DTC's. Are there any Charging System related Trouble Codes stored in the PCM?</p> <p>Yes → Refer to Symptoms - Possible Causes for Powertain diagnostics. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 32</p>	All
32	<p>With DRB, read Battery Voltage under Transmission Sensors. Increase Engine speed to 1500 RPM. Is the voltage below 17.7 volts?</p> <p>Yes → Go To 33</p> <p>No → Go To 34</p>	All
33	<p>Turn Key Off. At this time the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All
34	<p>Turn Key Off. Disconnect Transmission Control Module. Check connectors - Clean / repair as necessary. Measure the voltage at the Fused B(+) Circuit in the TCM Connector. Is the voltage below 17.7 volts?</p> <p>Yes → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Refer to symptom * CHARGING SYSTEM NO CODE.</p>	All

Symptom:
P0705 CHECK SHIFTER SIGNAL

When Monitored and Set Condition:

P0705 CHECK SHIFTER SIGNAL

When Monitored: Continuously.

Set Condition: No signals are received or two signals are received from the Transmission Range Sensor by the TCM.

POSSIBLE CAUSES

SHIFT LEVER POSITION CIRCUIT WIRING DAMAGED
TCM RANGE SWITCH CKT DEFECTIVE
TRS CIRCUIT ON TCM DEFECTIVE
TRS OD SENSE CKT ON TCM DEFECTIVE
TRS SENSE CKT AT TCM INOPERATIVE
TRS 1-2 SENSE CIRCUIT ON TCM DEFECTIVE
TRS 3 SENSE CIRCUIT ON TCM DEFECTIVE
TRS REVERSE SENSE CIRCUIT ON TCM DEFECTIVE
TRS SENSE CKT ON TCM DEFECTIVE
FUSED IGNITION SWITCH OUTPUT OPEN AT TRS CONNECTOR
TRS 1-2 SENSE CIRCUIT OPEN
TRS 3 SENSE CIRCUIT OPEN
TRS IN 1-2 IS OPEN
TRS IN 3RD IS OPEN
TRS IN OD IS OPEN
TRS INTERNAL FAILURE
TRS INTERNAL FAULT
TRS OD SENSE CIRCUIT OPEN
TRS OPEN IN REVERSE
TRS REVERSE SENSE CIRCUIT OPEN
TRS SENSE CIRCUIT OPEN
TRS SENSE CIRCUIT SHORT TO GROUND
TRS SENSE CIRCUIT SHORT TO VOLTAGE
TRS SENSE CIRCUIT SHORT TO VOLTAGE
TRS STUCK IN ON POSITION

TRANSMISSION

P0705 CHECK SHIFTER SIGNAL — Continued

TEST	ACTION	APPLICABILITY
35	While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in Park. Does the display indicate P/N ? Yes → Go To 36 No → Go To 63	All
36	While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in Reverse. Does the display indicate R ? Yes → Go To 37 No → Go To 51	All
37	While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in Neutral. Does the display indicate P/N ? Yes → Go To 38 No → Go To 63	All
38	While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in OD. Does the display indicate OD ? Yes → Go To 39 No → Go To 48	All
39	While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in 3. Does the display indicate 3 ? Yes → Go To 40 No → Go To 45	All
40	While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in 1-2. Does the display indicate 1-2 ? Yes → Go To 41 No → Go To 42	All
41	At this time, the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors for broken wires or bad connections. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found ? Yes → Repair as necessary. Perform Transmission Verification Test VER-1A No → Test Complete.	All
42	While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in 1-2. Does the 1-2 Range Switch indicate ON ? Yes → Go To 52 No → Go To 43	All

P0705 CHECK SHIFTER SIGNAL — Continued

TEST	ACTION	APPLICABILITY
43	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in 1-2. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TRS 1-2 Sense Circuit and the Fused Ignition Switch Output Circuit at the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 44</p> <p>No → Replace Trans Range Sensor. Perform Transmission Verification Test VER-1A</p>	All
44	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in 1-2. Turn Key Off. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the TRS 1-2 Sense Circuit from the TCM Connector to the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Repair open TRS 1-2 Sense Circuit between TCM and TRS Connector. Perform Transmission Verification Test VER-1A</p>	All
45	<p>While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in 3rd. Does the 3 Range Switch indicate ON ?</p> <p>Yes → Go To 52</p> <p>No → Go To 46</p>	All
46	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in 3rd. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TRS 3 Sense Circuit and the Fused Ignition Switch Output Circuit at the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 47</p> <p>No → Replace Trans Range Sensor. Perform Transmission Verification Test VER-1A</p>	All

TRANSMISSION

P0705 CHECK SHIFTER SIGNAL — Continued

TEST	ACTION	APPLICABILITY
47	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in 3. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the TRS 3 Sense Circuit from the TCM Connector to the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Repair open TRS 3 Sense Circuit between TCM and TRS Connector. Perform Transmission Verification Test VER-1A</p>	All
48	<p>While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in OD. Does the OD Range Switch indicate ON ?</p> <p>Yes → Go To 52</p> <p>No → Go To 49</p>	All
49	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in OD. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TRS OD Sense Circuit and the Fused Ignition Switch Output Circuit at the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 50</p> <p>No → Replace Trans Range Sensor. Perform Transmission Verification Test VER-1A</p>	All
50	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in OD. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the TRS OD Sense Circuit from the TCM Connector to the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Repair open TRS OD Sense Circuit between TCM and TRS Connector. Perform Transmission Verification Test VER-1A</p>	All
51	<p>While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in Reverse. Does the Reverse Range Switch indicate ON ?</p> <p>Yes → Go To 52</p> <p>No → Go To 56</p>	All

P0705 CHECK SHIFTER SIGNAL — Continued

TEST	ACTION	APPLICABILITY
52	<p>With DRB, check Powertrain Control Module DTC's. Is there a Park/Neutral DTC present ?</p> <p>Yes → Refer to symptom P-1899 P/N SWITCH STUCK IN PARK OR IN GEAR.</p> <p>No → Go To 53</p>	All
53	<p>Monitor INPUT/OUTPUT (SLP) with DRB. Do any of the other Range Switches indicate ON ?</p> <p>Yes → Go To 54</p> <p>No → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All
54	<p>Turn Key Off. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Do any of the other Range Switches indicate ON ?</p> <p>Yes → Go To 55</p> <p>No → Replace Transmission Range Sensor. Perform Transmission Verification Test VER-1A</p>	All
55	<p>Turn Key Off. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the voltage of the Sense Circuits that read ON. Are any of them above 10.0 volts ?</p> <p>Yes → Repair TRS Circuit(s) shorted to voltage. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All
56	<p>While monitoring INPUT/OUTPUT (SLP) with DRB, place Gear Select Lever in OD. Does the OD Range Switch indicate ON ?</p> <p>Yes → Go To 57</p> <p>No → Go To 59</p>	All
57	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in Reverse. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TRS R Sense Circuit and the Fused Ignition Switch Output Circuit at the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 58</p> <p>No → Replace Trans Range Sensor. Perform Transmission Verification Test VER-1A</p>	All

TRANSMISSION

P0705 CHECK SHIFTER SIGNAL — Continued

TEST	ACTION	APPLICABILITY
58	<p>Turn Key Off. Set Parking Brake. Place Gear Select Lever in Reverse. Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the TRS R Sense Circuit from the TCM Connector to the TRS Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Repair open TRS Reverse Sense Circuit between TCM and TRS Connector. Perform Transmission Verification Test VER-1A</p>	All
59	<p>Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Measure the voltage at the Fused Ignition Switch Output Circuit. Is the voltage above 10.0 volts ?</p> <p>Yes → Go To 60</p> <p>No → Repair open Fused Ignition Switch Output Circuit. Perform Transmission Verification Test VER-1A</p>	All
60	<p>Disconnect the 8-way Trans Range Sensor (TRS) Connector. Disconnect TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance of each of the TRS Sense Circuits from the TCM Connector to the TRS Connector. Is the resistance of any of the circuits above 5.0 ohms ?</p> <p>Yes → Repair open TRS Sense Circuit(s). Perform Transmission Verification Test VER-1A</p> <p>No → Go To 61</p>	All
61	<p>Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. While monitoring INPUT/OUTPUT with DRB, connect one end of a jumper wire to a 12 volt supply. Momentarily connect the other end to each of the TRS Sense Circuits. Did all of the Range Switch States indicate ON while 12 volts was applied ?</p> <p>Yes → Replace Transmission Range Sensor. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 62</p>	All

P0705 CHECK SHIFTER SIGNAL — Continued

TEST	ACTION	APPLICABILITY
62	Disconnect the 8-way Trans Range Sensor (TRS) Connector. Check connectors - Clean / repair as necessary. Disconnect TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between all of the TRS Sense Circuits and Ground. Is the resistance of any of the circuits below 5.0 ohms ? Yes → Repair TRS Sense Circuit(s) shorted to Ground. Perform Transmission Verification Test VER-1A No → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A	All
63	With DRB, check Powertrain Control Module DTC's. Is there a Park/Neutral DTC present ? Yes → Refer to symptom P-1899 P/N SWITCH STUCK IN PARK OR IN GEAR. No → Go To 64	All
64	With DRB, monitor Transmission INPUT/OUTPUT (Range Switches). Are any of the Switches On ? Yes → Go To 65 No → Refer to symptom * CHECKING THE PARK/NEUTRAL SWITCH (AUTO ONLY).	All
65	Disconnect 8-way TRS Connector. Check connectors - Clean / repair as necessary. With DRB, monitor Transmission INPUT/OUTPUT (Range Switches). Are any of the switches ON ? Yes → Go To 66 No → Replace Transmission Range Sensor. Perform Transmission Verification Test VER-1A	All
66	Turn Key Off. Disconnect 8-way TRS Connector. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Turn Key On. Measure the voltage of all the Sense Circuits that read ON. Are any of them above 10.0 volts ? Yes → Repair TRS Sense Circuit(s) shorted to voltage. Perform Transmission Verification Test VER-1A No → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A	All

TRANSMISSION

Symptom:

P0715 INPUT SPEED SENSOR

When Monitored and Set Condition:

P0715 INPUT SPEED SENSOR

When Monitored: Continuously while in 1st, 2nd, and 3rd Gear while an Output Speed Sensor (OSS) Signal is present and vehicle speed is over 8 MPH.

Set Condition: No signal from the Input Speed Sensor (ISS) while there is an OSS Signal present. The DTC will not be set until the TCM verifies the set condition in 2nd Gear for 1 second.

POSSIBLE CAUSES

INPUT SPEED SENSOR GROUND CIRCUIT SHORTED TO GROUND
ISS GROUND CIRCUIT OPEN
ISS SIGNAL CIRCUIT ON TCM DEFECTIVE
INPUT SPEED SENSE CIRCUIT SHRT TO GROUND
INPUT SPEED SENSE SIGNAL CIRCUIT OPEN
ISS SIGNAL SHORT TO ISS GROUND CIRCUIT
INPUT SPEED SENSE WIRING DAMAGED
INPUT SPEED SENSOR DEFECTIVE
INPUT SPEED SENSOR INTERNAL FAILURE

P0715 INPUT SPEED SENSOR — Continued

TEST	ACTION	APPLICABILITY
67	<p>Raise Drive Wheels off ground and properly support Vehicle. Note: Keep feet and hands away from rotating parts. Place Gear Select Lever in the 1-2 position and let wheels spin. Is the Input Shaft speed above 0 rpm ?</p> <p>Yes → Go To 68 No → Go To 69</p>	All
68	<p>At this time the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A No → Test Complete.</p>	All
69	<p>Turn Key Off. Disconnect the TCM Connector. Measure the resistance between the Input Speed Sensor (ISS) Ground Circuit and ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Input Speed Sensor Ground Circuit shorted to Ground. Perform Transmission Verification Test VER-1A No → Go To 70</p>	All
70	<p>Turn Key Off. Disconnect the TCM Connector. Measure the resistance between the Input Speed Sensor Signal Circuit and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Input Speed Sensor Signal Circuit shorted to Ground. Perform Transmission Verification Test VER-1A No → Go To 71</p>	All
71	<p>Turn Key Off. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the ISS Signal Circuit and the ISS Ground Circuit at the TCM Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 72 No → Go To 73</p>	All
72	<p>Turn Key Off. Disconnect the Input Speed Sensor Connector. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the ISS Signal Circuit and the ISS Ground Circuit at the TCM Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair ISS Signal Circuit shorted to ISS Ground Circuit. Perform Transmission Verification Test VER-1A No → Replace Input Speed Sensor. Perform Transmission Verification Test VER-1A</p>	All

P0715 INPUT SPEED SENSOR — Continued

TEST	ACTION	APPLICABILITY
73	Turn Key Off. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the ISS Signal Circuit and the ISS Ground Circuit at the TCM Connector. Is the resistance between 400 and 1000 ohms ? Yes → Replace TCM. Perform Transmission Verification Test VER-1A No → Go To 74	All
74	Turn Key Off. Disconnect the Input Speed Sensor Connector. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the ISS Signal Circuit from the TCM Connector to the ISS Connector. Is the resistance above 5.0 ohms ? Yes → Repair open ISS Signal Circuit. Perform Transmission Verification Test VER-1A No → Go To 75	All
75	Turn Key Off. Disconnect the Input Speed Sensor Connector. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the ISS Ground Circuit from the TCM Connector to the ISS Connector. Is the resistance above 5.0 ohms ? Yes → Repair open ISS Ground Circuit. Perform Transmission Verification Test VER-1A No → Replace the Input Speed Sensor. Perform Transmission Verification Test VER-1A	All

Symptom:
P0720 OUTPUT SPEED SENSOR

When Monitored and Set Condition:

P0720 OUTPUT SPEED SENSOR

When Monitored: Continuously with vehicle speed over 6 MPH (communicated over CCD Bus) and the Transmission is in a forward gear (OD, 3, or 1-2).

Set Condition: No signal from the Output Speed Sensor (OSS) for 100 seconds.

POSSIBLE CAUSES

OSS GROUND CIRCUIT OPEN
OUTPUT SPEED SENSOR GROUND CIRCUIT SHORTED TO GROUND
OSS SIGNAL CIRCUIT ON TCM DEFECTIVE
OSS SIGNAL SHORT TO OSS GROUND CIRCUIT
OUTPUT SPEED SENSE CIRCUIT SHRT TO GROUND
OUTPUT SPEED SENSE SIGNAL CIRCUIT OPEN
OUTPUT SPEED SENSE WIRING DAMAGED
OUTPUT SPEED SENSOR DEFECTIVE
OUTPUT SPEED SENSOR INTERNAL FAILURE

TRANSMISSION

P0720 OUTPUT SPEED SENSOR — Continued

TEST	ACTION	APPLICABILITY
76	<p>Raise Drive Wheels off ground and properly support Vehicle. Place Gear Select Lever in the 1-2 position and let wheels spin. Is the Output Shaft speed above 0 rpm ?</p> <p>Yes → Go To 77</p> <p>No → Go To 78</p>	All
77	<p>At this time the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All
78	<p>Turn Key Off. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Output Speed Sensor (OSS) Ground Circuit and ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Output Speed Sensor Ground Circuit shorted to Ground. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 79</p>	All
79	<p>Turn Key Off. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Output Speed Sensor (OSS) Signal Circuit and ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Output Speed Sensor Signal Circuit shorted to Ground. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 80</p>	All
80	<p>Turn Key Off. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the OSS Signal Circuit and the OSS Ground Circuit at the TCM Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 81</p> <p>No → Go To 82</p>	All

P0720 OUTPUT SPEED SENSOR — Continued

TEST	ACTION	APPLICABILITY
81	<p>Turn Key Off. Disconnect the Output Speed Sensor Connector. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the OSS Signal Circuit and the OSS Ground Circuit at the TCM Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair OSS Signal Circuit shorted to OSS Ground Circuit. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Output Speed Sensor. Perform Transmission Verification Test VER-1A</p>	All
82	<p>Turn Key Off. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the OSS Signal Circuit and the OSS Ground Circuit at the TCM Connector. Is the resistance between 400 and 1000 ohms ?</p> <p>Yes → Replace TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 83</p>	All
83	<p>Turn Key Off. Disconnect the Output Speed Sensor Connector. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the OSS Signal Circuit from the TCM Connector to the OSS Connector. Is the resistance above 5.0 ohms ?</p> <p>Yes → Repair open OSS Signal Circuit. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 84</p>	All
84	<p>Turn Key Off. Disconnect the Output Speed Sensor Connector. Check connectors - Clean / repair as necessary. Disconnect the TCM Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the OSS Ground Circuit from the TCM Connector to the OSS Connector. Is the resistance above 5.0 ohms ?</p> <p>Yes → Repair open OSS Ground Circuit. Perform Transmission Verification Test VER-1A</p> <p>No → Replace the Output Speed Sensor. Perform Transmission Verification Test VER-1A</p>	All

TRANSMISSION

Symptom:

P0740 TCC SOLENOID C FUNCTIONAL FAULT

When Monitored and Set Condition:

P0740 TCC SOLENOID C FUNCTIONAL FAULT

When Monitored: Continuously while the TCC Solenoid is energized.

Set Condition: The Solenoid is energized and the Engine RPM does not equal Transmission Input RPM or the Solenoid is deenergized and Engine RPM equals Transmission RPM.

POSSIBLE CAUSES

CODE P1749 AND/OR P1748 ALSO PRESENT

INTERNAL TRANSMISSION PROBLEM CAUSES CODE P0740

OIL PAN CONTAINS EXCESSIVE DEBRIS

TPS RELATED DTC STORED IN PCM

P0740 TCC SOLENOID C FUNCTIONAL FAULT — Continued

TEST	ACTION	APPLICABILITY
85	<p>Check the DRB for TPS Signal Circuit Code. Is the TPS Signal Circuit Code present ?</p> <p>Yes → Refer to symptom P0122 THROTTLE POSITION SENSOR SIGNAL CIRCUIT.</p> <p>No → Go To 86</p>	All
86	<p>With DRB, read Powertrain Control Module (PCM) Trouble Codes. Are there any TPS related Codes stored in the PCM ?</p> <p>Yes → Refer to Symptoms - Possible Causes for Powertrain Diagnostics. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 87</p>	All
87	<p>With DRB, read TCM Trouble Codes. Is there a Code P1749 and/or P1748 present ?</p> <p>Yes. Code P1749 present. Refer to symptom P1749 TCC SOLENOID C SHORTED TO VOLTAGE OR OPEN.</p> <p>Yes. Code P1748 present. Refer to symptom P1748 TCC SOLENOID C SHORTED TO GROUND.</p> <p>Yes. Both Codes P1749 and P1748 present. Perform tests for Code P1749. If problem is not located, run tests for Code P1748. Perform Transmission Verification Test VER-1A</p> <p>No. Go To 88</p>	All
88	<p>With DRB, erase Transmission Trouble Codes. Test drive vehicle, maintain a steady speed of 55 mph for at least 30 seconds then slowly stop. Note shift patterns while vehicle is upshifting and downshifting. Did the TCC engage properly during the test drive ?</p> <p>Yes → Go To 89</p> <p>No → Go To 90</p>	All
89	<p>Did the Vehicle shift hard and / or did the Engine stumble just before coming to a stop ?</p> <p>Yes → Go To 90</p> <p>No → Test Complete.</p>	All
90	<p>Turn Engine Off. Remove Transmission Oil Pan per service instructions. Inspect Pan for burnt oil, excessive debris, or friction material. Is the Oil burnt and/or does the Pan contain excessive debris or friction material ?</p> <p>Yes → Repair internal Transmission problem as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 91</p>	All

TRANSMISSION

P0740 TCC SOLENOID C FUNCTIONAL FAULT — Continued

TEST	ACTION	APPLICABILITY
91	<p>Replace TCC Solenoid (C). With DRB, erase Transmission Trouble Codes. Test drive vehicle, maintain a steady speed of 55 mph for at least 30 seconds then slowly stop. Note shift patterns while vehicle is upshifting and downshifting. Is the problem fixed ?</p> <p>Yes → Test Complete.</p> <p>No → Repair internal Transmission problem as necessary. Perform Transmission Verification Test VER-1A</p>	All

Symptom:**P0751 SOLENOID A FUNCTIONAL FAULT****When Monitored and Set Condition:****P0751 SOLENOID A FUNCTIONAL FAULT**

When Monitored: Continuously while at higher vehicle speeds and high engine load conditions. The vehicle must be driven on the road. This code will not set on a hoist.

Set Condition: The Gear Ratio is incorrect for the current request gear.

POSSIBLE CAUSES

TRANS OIL BURNT OR CONTAINS DEBRIS

CODE P1745 OR P1744 ALSO PRESENT

INTERNAL TRANSMISSION PROBLEM CAUSES DTC P0751

TPS CODES STORED IN PCM

TRANSMISSION

P0751 SOLENOID A FUNCTIONAL FAULT — Continued

TEST	ACTION	APPLICABILITY
92	<p>Check the DRB for TPS Signal Circuit Code. Is the TPS Signal Circuit Code present ?</p> <p>Yes → Refer to symptom P0122 THROTTLE POSITION SENSOR SIGNAL CIRCUIT.</p> <p>No → Go To 93</p>	All
93	<p>With DRB, read Powertrain Control Module (PCM) Trouble Codes. Are there any TPS related Codes stored in the PCM ?</p> <p>Yes → Refer to Symptoms - Possible Causes for Powertrain Diagnostics. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 94</p>	All
94	<p>With DRB, read TCM Trouble Codes. Is there a Code P1745 and/or P1744 ?</p> <p>Yes. Code P1745 present. Refer to symptom P1745 SOLENOID A SHORTED TO VOLTAGE OR OPEN.</p> <p>Yes. Code P1744 present. Refer to symptom P1744 SOLENOID A SHORTED TO GROUND.</p> <p>Yes. Both Codes P1745 and P1744 present. Perform tests for Code P1745. If problem is not located, run tests for Code P1744. Perform Transmission Verification Test VER-1A</p> <p>No. Go To 95</p>	All
95	<p>With DRB, erase Transmission Trouble Codes. Test drive vehicle, attain a steady speed of 55 mph for at least 30 seconds then slowly stop. Note shift patterns while vehicle is upshifting or down shifting. Did the vehicle shift normally through all forward gears (1st through 4th) ?</p> <p>Yes → Test Complete.</p> <p>No → Go To 96</p>	All
96	<p>Turn Engine Off. Remove Transmission Oil Pan. Inspect Pan for burnt oil, excessive debris, and/or friction material. Is the oil burnt and/or does the Pan contain excessive debris or friction material ?</p> <p>Yes → Repair internal Transmission problem as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 97</p>	All
97	<p>Replace Solenoid A. With DRB, erase Transmission Trouble Codes. Test drive vehicle, maintain a steady speed of 55 mph for at least 30 seconds then slowly stop. Note shift patterns while vehicle is upshifting and downshifting. Is the problem fixed ?</p> <p>Yes → Test Complete.</p> <p>No → Repair internal Transmission problem as necessary. Perform Transmission Verification Test VER-1A</p>	All

Symptom:**P0756 SOLENOID B FUNCTIONAL FAULT****When Monitored and Set Condition:****P0756 SOLENOID B FUNCTIONAL FAULT**

When Monitored: Continuously while at higher vehicle speeds and high engine load conditions. The vehicle must be driven on the road. This code will not set on a hoist.

Set Condition: The gear ratio is incorrect for the current request.

POSSIBLE CAUSES

OIL BURNT OR CONTAINS EXCESS DEBRIS

PCM DTC'S ALSO PRESENT

CODE P1747 OR P1746 ALSO PRESENT

INTERNAL TRANSMISSION PROBLEM CAUSES CODE P0756

TRANSMISSION

P0756 SOLENOID B FUNCTIONAL FAULT — Continued

TEST	ACTION	APPLICABILITY
98	<p>Check the DRB for TPS Signal Code. Is the TPS Signal Circuit Code present ?</p> <p>Yes → Refer to symptom P0122 THROTTLE POSITION SENSOR SIGNAL CIRCUIT.</p> <p>No → Go To 99</p>	All
99	<p>With DRB, read Powertrain Control Module (PCM) Trouble Codes. Are there any TPS related Codes stored in the PCM ?</p> <p>Yes → Perform appropriate Powertrain diagnostics. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 100</p>	All
100	<p>With DRB, read TCM Trouble Codes. Is there a Code P1747 and/or P1746 ?</p> <p>Yes. Code P1747 present. Refer to symptom P1747 SOLENOID B SHORTED TO VOLTAGE OR OPEN.</p> <p>Yes. Code P1746 present. Refer to symptom P1746 SOLENOID B SHORTED TO GROUND.</p> <p>Yes. Both Codes P1747 and P1746 present. Perform tests for Code P1747. If problem is not located, run tests for Code P1746. Perform Transmission Verification Test VER-1A</p> <p>No. Go To 101</p>	All
101	<p>With DRB, erase Transmission Trouble Codes. Test drive vehicle, maintain a steady speed of 55 mph for at least 30 seconds then slowly stop. Note shift patterns while vehicle is upshifting and downshifting. Does the Transmission hang in 1st gear or does it launch in 4th gear ?</p> <p>Yes → Go To 102</p> <p>No → Test Complete.</p>	All
102	<p>Turn Engine Off. Remove Transmission Oil Pan. Inspect Pan for burnt oil, excessive debris, or friction material. Is the Oil burnt and/or does the Pan contain excessive debris or friction material ?</p> <p>Yes → Repair internal Transmission problem as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 103</p>	All
103	<p>Replace Solenoid B. With DRB, erase Transmission Trouble Codes. Test drive vehicle, maintain a steady speed of 55 mph for at least 30 seconds then slowly stop. Note shift patterns while vehicle is upshifting and downshifting. Is the problem fixed ?</p> <p>Yes → Test Complete.</p> <p>No → Repair internal Transmission problem as necessary. Perform Transmission Verification Test VER-1A</p>	All

Symptom:**P1694 NO CCD MESSAGE FROM PCM****When Monitored and Set Condition:****P1694 NO CCD MESSAGE FROM PCM**

When Monitored: Continuously with Key On.

Set Condition: No CCD Bus messages received from PCM for 20 seconds or invalid messages received for 20 seconds.

POSSIBLE CAUSES

CCD BUS(-) BETWEEN PCM & TCM OPEN

CCD BUS(+) BETWEEN PCM & TCM OPEN

TRANSMISSION CCD BUS WIRING DAMAGED

TCM DEFECTIVE - CCD BUS OPEN

TRANSMISSION

P1694 NO CCD MESSAGE FROM PCM — Continued

TEST	ACTION	APPLICABILITY
104	<p>With DRB, erase Transmission DTC's. Start the Engine and let it run for at least 2 minutes. With DRB, read DTC's. Did the Code return ?</p> <p>Yes → Go To 105 No → Go To 108</p>	All
105	<p>Start the Engine and let it run for at least 2 minutes. Check Instrument Cluster Gauges for proper operation. Do the Fuel Gauge and the Speedometer work?</p> <p>Yes → Go To 106 No → Refer to symptom * NO RESPONSE FROM POWERTRAIN CONTROL MODULE.</p>	All
106	<p>Turn Key Off. Disconnect the Transmission Control Module (TCM). Disconnect the Powertrain Control Module (PCM). Check connectors - Clean / repair as necessary. Measure the resistance of the CCD Bus(-) Circuit between the PCM Connector and the TCM Connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the open CCD Bus(-) Circuit between the PCM and the TCM. Perform Transmission Verification Test VER-1A No → Go To 107</p>	All
107	<p>Turn Key Off. Disconnect the Transmission Control Module (TCM). Check connectors - Clean / repair as necessary. Disconnect the Powertrain Control Module (PCM). Check connectors - Clean / repair as necessary. Measure the resistance of the CCD Bus(+) Circuit between the PCM Connector and the TCM Connector. Is the resistance above 5.0 ohms?</p> <p>Yes → Repair the open CCD Bus(+) Circuit between the PCM and the TCM. Perform Transmission Verification Test VER-1A No → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All
108	<p>Turn Key Off. At this time the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A No → Test Complete.</p>	All

Symptom:**P1718 INTERNAL TCM**

POSSIBLE CAUSES
INTERNAL TCM DEFECT CAUSES CODE P1718

TRANSMISSION

P1718 INTERNAL TCM — Continued

Repair Instructions:

INTERNAL TCM DEFECT CAUSES CODE P1718

Replace TCM.

Perform Transmission Verification Test VER-1A

Symptom:**P1742 INTERNAL TCM****POSSIBLE CAUSES****INTERNAL TCM DEFECT CAUSES CODE P1742**

TRANSMISSION

P1742 INTERNAL TCM — Continued

Repair Instructions:

INTERNAL TCM DEFECT CAUSES CODE P1742

Replace TCM.

Perform Transmission Verification Test VER-1A

Symptom:

P1743 INTERNAL TCM

POSSIBLE CAUSES
INTERNAL TCM DEFECT CAUSES CODE P1743

TRANSMISSION

P1743 INTERNAL TCM — Continued

Repair Instructions:

INTERNAL TCM DEFECT CAUSES CODE P1743

Replace TCM.

Perform Transmission Verification Test VER-1A

Symptom:**P1744 SOLENOID A SHORTED TO GROUND****When Monitored and Set Condition:****P1744 SOLENOID A SHORTED TO GROUND**

When Monitored: Continuously while in 2nd and 3rd Gear.

Set Condition: The Solenoid is turned on and low voltage is detected on the Control Circuit.

POSSIBLE CAUSES

SOLENOID A CONTROL CIRCUIT ON TCM OPEN

SOLENOID A CONTROL CIRCUIT OPEN AT TCM

SOLENOID A CONTROL CIRCUIT SHORT TO GND AT 8-WAY CONNECTOR

SOLENOID A INTERNAL FAILURE

SOLENOID A WIRING AND / OR CONNECTOR DEFECTIVE

TCM SOLENOID A CONTROL CIRCUIT SHORT TO GROUND

TRANSMISSION

P1744 SOLENOID A SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
109	<p>With the DRB, record and clear DTC's in the Transmission Control Module (TCM). The vehicle must be driven on the road for the next step. Place Gear Selector in 3 Range and accelerate vehicle to 40 mph. Hold at 40 mph for 30 seconds. Did the Code reoccur ?</p> <p>Yes → Go To 110</p> <p>No → Go To 114</p>	All
110	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid A Control Circuit in the Vehicle Harness side of the connector and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 111</p> <p>No → Go To 112</p>	All
111	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid A Control Circuit at the TCM Connector and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Solenoid A Control Circuit shorted to ground between Transmission and TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All
112	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid A Control Circuit in the Transmission Harness side of the 8-way Connector and ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 113</p> <p>No → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All

P1744 SOLENOID A SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
113	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Remove the Transmission Oil. Disconnect the Solenoid A Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid A Control Circuit in the Transmission Harness side of the 8-way Connector and ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Solenoid A Control Circuit shorted to ground between Solenoid and 8-way Solenoid Connector. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Solenoid A. Perform Transmission Verification Test VER-1A</p>	All
114	<p>At this time, the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All

TRANSMISSION

Symptom:

P1745 SOLENOID A SHORTED TO VOLTAGE OR OPEN

When Monitored and Set Condition:

P1745 SOLENOID A SHORTED TO VOLTAGE OR OPEN

When Monitored: Continuously while in 1st and 4th Gear.

Set Condition: The Solenoid is turned off and voltage is detected on the Control Circuit.

POSSIBLE CAUSES
TRANSMISSION SOLENOID CASE GROUND FAULTY
SOLENOID A CONTROL CIRCUIT ON TCM SHORTED
SOLENOID A CONTROL CIRCUIT OPEN
SOLENOID A CONTROL CIRCUIT SHORT TO VOLTAGE
SOLENOID A WIRING AND / OR CONNECTOR DAMAGE
SOLENOID A COIL OPEN
SOLENOID A CONTROL CIRCUIT OPEN AT 8-WAY CONNECTOR
SOLENOID CONNECTOR AND WIRE DAMAGED

P1745 SOLENOID A SHORTED TO VOLTAGE OR OPEN — Continued

TEST	ACTION	APPLICABILITY
115	<p>Check DTC's with the DRB. Is there a Code P1747 and a Code P1749 stored in addition to this code (Code P1745)?</p> <p>Yes → Repair bad Case Ground. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 116</p>	All
116	<p>Check Solenoid Connector and wiring to the Solenoid. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 117</p>	All
117	<p>With the DRB, record and clear DTC's in the Transmission Control Module (TCM). Place vehicle in Park and idle for 60 seconds. Did the Code reoccur ?</p> <p>Yes → Go To 118</p> <p>No → Go To 122</p>	All
118	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid A Control Circuit in the Transmission Harness side of the connector and ground. Is the resistance below 20.0 ohms ?</p> <p>Yes → Go To 119</p> <p>No → Go To 121</p>	All
119	<p>Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Turn Key On. Measure the voltage at the Solenoid #1 Control Circuit at the TCM Connector. Is the voltage above 1.0 volt ?</p> <p>Yes → Repair Solenoid A Control Circuit shorted to voltage between Transmission and TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 120</p>	All
120	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the Solenoid A Control Circuit from the TCM Connector to the 8-way Solenoid Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Repair Solenoid A Control Circuit open between Transmission 8-way Solenoid Connector and TCM. Perform Transmission Verification Test VER-1A</p>	All

TRANSMISSION

P1745 SOLENOID A SHORTED TO VOLTAGE OR OPEN — Continued

TEST	ACTION	APPLICABILITY
121	<p>Remove the Transmission Oil Pan. Disconnect the Solenoid A Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the connector on Solenoid A and ground. Is the resistance below 20.0 ohms ?</p> <p>Yes → Repair Solenoid A Control Circuit open between Solenoid and 8-way Solenoid Connector. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Solenoid A. Perform Transmission Verification Test VER-1A</p>	All
122	<p>At this time, the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All

Symptom:**P1746 SOLENOID B SHORTED TO GROUND****When Monitored and Set Condition:****P1746 SOLENOID B SHORTED TO GROUND**

When Monitored: Continuously while in 1st or 2nd Gear.

Set Condition: The Solenoid is turned on and low voltage is detected on the Control Circuit.

POSSIBLE CAUSES

SOLENOID B CONTROL CIRCUIT ON TCM OPEN

SOLENOID B WIRING AND / OR CONNECTOR DEFECTIVE

SOLENOID B CONTROL CIRCUIT OPEN AT TCM

SOLENOID B CONTROL CIRCUIT SHORT TO GND AT 8-WAY CONN

SOLENOID B INTERNAL FAILURE

TCM SOLENOID B CONTROL CIRCUIT SHORT TO GROUND

TRANSMISSION

P1746 SOLENOID B SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
123	<p>With the DRB, record and clear DTC's in the Transmission Control Module (TCM). Place vehicle in Park and idle for 60 seconds. Did the Code reoccur ?</p> <p>Yes → Go To 124</p> <p>No → Go To 128</p>	All
124	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid B Control Circuit in the Vehicle Harness side of the connector and ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 125</p> <p>No → Go To 126</p>	All
125	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid B Control Circuit at the TCM Connector and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Solenoid B Control Circuit shorted to Ground between Trans and TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All
126	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid B Control Circuit in the Transmission Harness side of the 8-way Connector and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 127</p> <p>No → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All
127	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Remove the Transmission Oil Pan per Service Manual instructions. Disconnect the Solenoid B Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid B Control Circuit in the Transmission Harness side of the 8-way Connector and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Solenoid B Control Circuit shorted to ground between Solenoid and 8-way Solenoid Connector. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Solenoid B. Perform Transmission Verification Test VER-1A</p>	All

P1746 SOLENOID B SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
128	<p>At this time, the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors.</p> <p>Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins.</p> <p>Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All

TRANSMISSION

Symptom:

P1747 SOLENOID B SHORTED TO VOLTAGE OR OPEN

When Monitored and Set Condition:

P1747 SOLENOID B SHORTED TO VOLTAGE OR OPEN

When Monitored: Continuously while in 3rd or 4th Gear.

Set Condition: The Solenoid is turned off and voltage is detected on the Control Circuit.

POSSIBLE CAUSES
CONNECTOR OR WIRING TO SOLENOIDS DEFECTIVE
TRANSMISSION SOLENOID CASE GROUND BAD
SOLENOID B CONTROL CIRCUIT ON TCM SHORTED
SOL B CONTROL CIRCUIT SHORT TO VOLTAGE
SOLENOID B CONTROL CIRCUIT OPEN
SOLENOID B WIRING AND / OR CONNECTOR DAMAGE
SOLENOID B COIL OPEN
SOLENOID B CONTROL CIRCUIT OPEN AT 8-WAY CONNECTOR

P1747 SOLENOID B SHORTED TO VOLTAGE OR OPEN — Continued

TEST	ACTION	APPLICABILITY
129	<p>Check DTC's with the DRB. Is there a Code P1745 and a Code P1749 stored in addition to this code (Code P1747)?</p> <p>Yes → Repair bad Case Ground. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 130</p>	All
130	<p>Check Solenoid Connector and wiring to the Solenoid. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 131</p>	All
131	<p>With the DRB, record and clear DTC's in the Transmission Control Module (TCM). The vehicle must be driven on the road for the next step. Place vehicle in 3 Range and accelerate the vehicle to 40 mph, hold for 30 seconds . Did the Code reoccur ?</p> <p>Yes → Go To 132</p> <p>No → Go To 136</p>	All
132	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the Solenoid B Control Circuit in the Transmission Harness side of the connector and Ground. Is the resistance below 20.0 ohms ?</p> <p>Yes → Go To 133</p> <p>No → Go To 135</p>	All
133	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Turn Key On. Measure the voltage at the Solenoid B Control Circuit at the TCM Connector. Is the voltage above 1.0 volt ?</p> <p>Yes → Repair Solenoid B Control Circuit shorted to voltage between Transmission and TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 134</p>	All

TRANSMISSION

P1747 SOLENOID B SHORTED TO VOLTAGE OR OPEN — Continued

TEST	ACTION	APPLICABILITY
134	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the Solenoid #2 Control Circuit from the TCM Connector to the 8-way Solenoid Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Repair Solenoid B Control Circuit open between Transmission 8-way Solenoid Connector and TCM. Perform Transmission Verification Test VER-1A</p>	All
135	<p>Remove the Transmission Oil Pan. Disconnect the Solenoid #2 Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the connector on Solenoid B and Ground. Is the resistance below 20.0 ohms ?</p> <p>Yes → Repair Solenoid B Control Circuit open between Solenoid and 8-way Solenoid Connector. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Solenoid B. Perform Transmission Verification Test VER-1A</p>	All
136	<p>At this time, the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All

Symptom:**P1748 TCC SOLENOID C SHORTED TO GROUND****When Monitored and Set Condition:****P1748 TCC SOLENOID C SHORTED TO GROUND**

When Monitored: Continuously while the TCC Solenoid is energized.

Set Condition: The Solenoid is turned off and low voltage is detected on the Control Circuit for 12.5 seconds.

POSSIBLE CAUSES

SOLENOID C CONTROL CIRCUIT ON TCM OPEN
SOLENOID C CONTROL CIRCUIT SHORT TO GND AT 8-WAY CONN
SOLENOID C CONTROL CIRCUIT OPEN AT TCM
SOLENOID C INTERNAL FAILURE
SOLENOID C WIRING AND / OR CONNECTOR DEFECTIVE
TCM SOLENOID C CONTROL CIRCUIT SHORT TO GROUND

TRANSMISSION

P1748 TCC SOLENOID C SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
137	<p>With the DRB, record and clear DTC's in the Transmission Control Module (TCM). The vehicle must be driven on the road for the next step. Place Gear Selector in 3 Range and accelerate vehicle to 40 mph and hold for 30 seconds. Did the Code reoccur ?</p> <p>Yes → Go To 138</p> <p>No → Go To 142</p>	All
138	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TCC Solenoid C Control Circuit in the Vehicle Harness side of the connector and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 139</p> <p>No → Go To 140</p>	All
139	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TCC Solenoid C Control Circuit at the TCM Connector and Ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair Solenoid C Control Circuit shorted to Ground between Transmission and TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All
140	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TCC Solenoid C Control Circuit in the Transmission Harness side of the 8-way Solenoid Connector and ground. Is the resistance below 5.0 ohms ?</p> <p>Yes → Go To 141</p> <p>No → Replace the Transmission Control Module. Perform Transmission Verification Test VER-1A</p>	All

P1748 TCC SOLENOID C SHORTED TO GROUND — Continued

TEST	ACTION	APPLICABILITY
141	<p>Turn Key Off.</p> <p>Disconnect the Transmission Solenoid 8-way Connector.</p> <p>Remove the Transmission Oil Pan.</p> <p>Disconnect the Solenoid C Connector.</p> <p>Check connectors - Clean / repair as necessary.</p> <p>Measure the resistance between the TCC Solenoid C Control Circuit in the Transmission Harness side of the Solenoid 8-way Connector and ground.</p> <p>Is the resistance below 5.0 ohms ?</p> <p>Yes → Repair TCC Solenoid C Control Circuit shorted to ground between Solenoid and 8-way Connector.</p> <p>Perform Transmission Verification Test VER-1A</p> <p>No → Replace TCC Solenoid C.</p> <p>Perform Transmission Verification Test VER-1A</p>	All
142	<p>At this time, the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors.</p> <p>Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins.</p> <p>Were any problems found ?</p> <p>Yes → Repair as necessary.</p> <p>Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All

TRANSMISSION

Symptom:

P1749 TCC SOLENOID C SHORTED TO VOLTAGE OR OPEN

When Monitored and Set Condition:

P1749 TCC SOLENOID C SHORTED TO VOLTAGE OR OPEN

When Monitored: Continuously while the TCC Solenoid is deenergized.

Set Condition: The Solenoid is turned off and voltage is detected on the Control Circuit for 12.5 seconds.

POSSIBLE CAUSES

CONNECTOR OR WIRING TO SOLENOIDS DEFECTIVE

TRANSMISSION SOLENOID CASE GROUND FAULTY

SOLENOID C CONTROL CIRCUIT ON TCM SHORTED

SOLENOID C CONTROL CIRCUIT OPEN

SOLENOID C CONTROL CIRCUIT SHORT TO VOLTAGE

SOLENOID C WIRING AND / OR CONNECTOR DAMAGE

SOLENOID C COIL OPEN

SOLENOID C CONTROL CIRCUIT OPEN AT 8-WAY CONNECTOR

P1749 TCC SOLENOID C SHORTED TO VOLTAGE OR OPEN — Continued

TEST	ACTION	APPLICABILITY
143	<p>Check DTC's with the DRB. Is there a Code P1745 and a Code P1747 stored in addition to this code (Code P1749)?</p> <p>Yes → Repair bad Case Ground. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 144</p>	All
144	<p>Check Solenoid Connector and wiring to the Solenoid. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 145</p>	All
145	<p>With the DRB, record and clear DTC's in the Transmission Control Module (TCM). Place vehicle in Park, and idle for 60 seconds. Did the Code reoccur ?</p> <p>Yes → Go To 146</p> <p>No → Go To 150</p>	All
146	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the TCC Solenoid C Control Circuit in the Transmission Harness side of the connector and ground. Is the resistance below 20.0 ohms ?</p> <p>Yes → Go To 147</p> <p>No → Go To 149</p>	All
147	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Turn Key On. Measure the voltage at the TCC Solenoid C Control Circuit at the TCM Connector. Is the voltage above 1.0 volt ?</p> <p>Yes → Repair Solenoid C Control Circuit shorted to voltage between Transmission and TCM. Perform Transmission Verification Test VER-1A</p> <p>No → Go To 148</p>	All
148	<p>Turn Key Off. Disconnect the Transmission Solenoid 8-way Connector. Disconnect the Transmission Control Module (TCM) Connector. Check connectors - Clean / repair as necessary. Measure the resistance of the TCC Solenoid C Control Circuit from the TCM Connector to the 8-way Solenoid Connector. Is the resistance below 5.0 ohms ?</p> <p>Yes → Replace Transmission Control Module. Perform Transmission Verification Test VER-1A</p> <p>No → Repair TCC Solenoid C Control Circuit open between Transmission 8-way Solenoid Connector and TCM. Perform Transmission Verification Test VER-1A</p>	All

TRANSMISSION

P1749 TCC SOLENOID C SHORTED TO VOLTAGE OR OPEN — Continued

TEST	ACTION	APPLICABILITY
149	<p>Remove the Transmission Oil Pan. Turn Key Off. Disconnect the TCC Solenoid C Connector. Check connectors - Clean / repair as necessary. Measure the resistance between the connector on the TCC Solenoid C and Ground. Is the resistance below 20.0 ohms ?</p> <p>Yes → Repair TCC Solenoid C Control Circuit open between Solenoid and 8-way Solenoid Connector. Perform Transmission Verification Test VER-1A</p> <p>No → Replace TCC Solenoid C. Perform Transmission Verification Test VER-1A</p>	All
150	<p>At this time, the conditions necessary to set this Code are not present. Using the schematic as a guide, inspect the wiring and connectors. Visually inspect wiring harness and connectors. Look for - broken, bent, pushed out, or corroded terminals; chafed, pierced, or partially broken wire. Check Hotlines or Technical Service Bulletins. Were any problems found ?</p> <p>Yes → Repair as necessary. Perform Transmission Verification Test VER-1A</p> <p>No → Test Complete.</p>	All

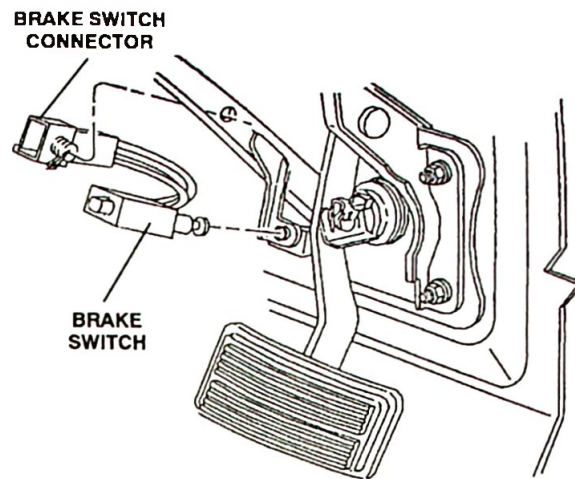
VERIFICATION TESTS

AW4 ELEC TRANSAXLE VER-1A TEST	APPLICABILITY
<p>Leave the DRB connected to the Data Link Connector (DLC). Reconnect any disconnected components. With the DRB, erase all Trouble Codes.</p> <p>With the DRB, display Engine Temperature. Start and run the engine until the Engine Temperature is HOT (above 180 deg. F) CHECK THE TRANSMISSION FLUID. ADJUST IF NECESSARY.</p> <p>Road test the vehicle. With the DRB, monitor the engine RPM. Make 15 to 20 1-2, 2-3, 3-4 upshifts. Perform these shifts from a standing start to 55 MPH with a constant throttle opening of 20 to 25 degrees.</p> <p>Below 25 MPH, make 5 to 8 wide open throttle kickdowns to 1st gear. Allow at least 5 seconds each in 2nd and 3rd gear between each kickdown.</p> <p>Check for Trouble Codes after the road test.</p> <p>Were any Trouble Codes set during the road test ?</p> <p>Yes → Refer to Symptom List for appropriate diagnostic tests. Perform Transmission Verification Test VER-1A</p> <p>No → Test complete.</p>	All

NOTES

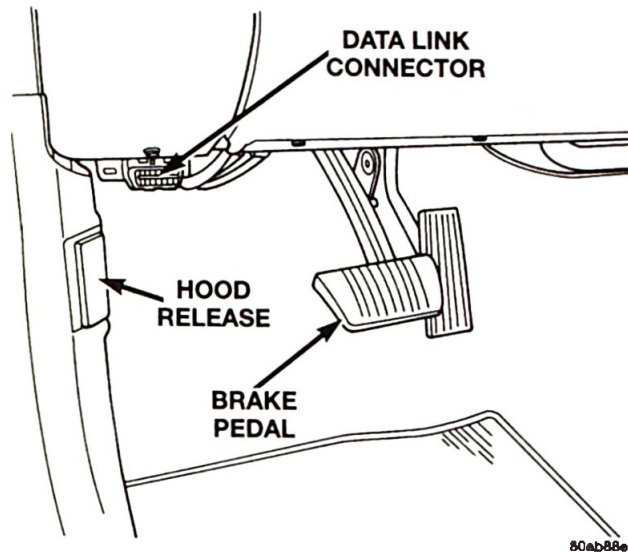
8.0 COMPONENT LOCATIONS

8.1 BRAKE SWITCH



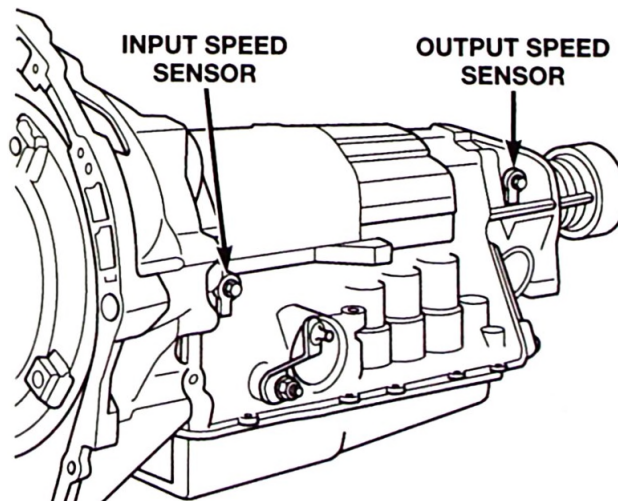
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8.2 DATA LINK



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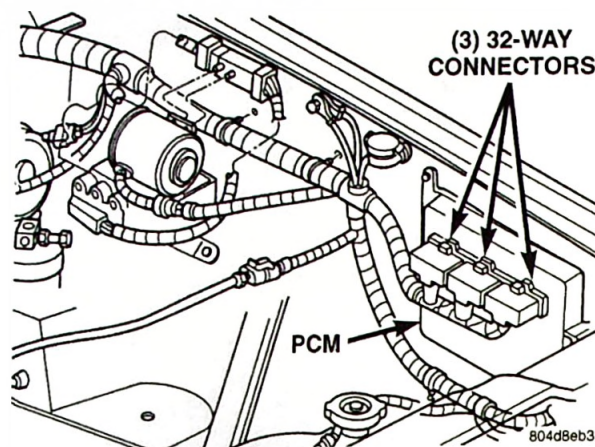
8.3 INPUT AND OUTPUT SPEED SENSORS



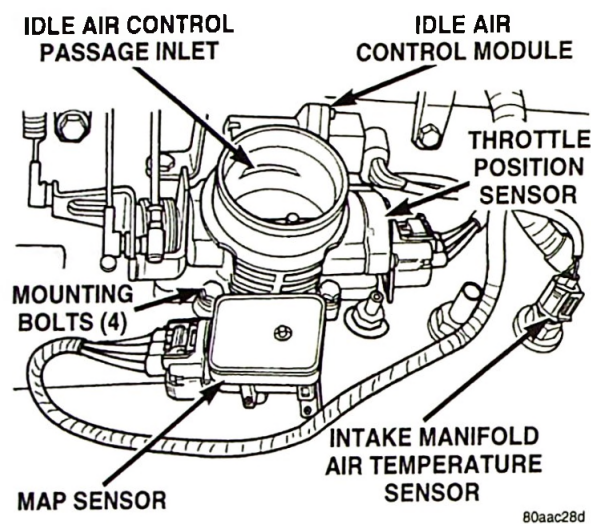
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COMPONENT LOCATIONS

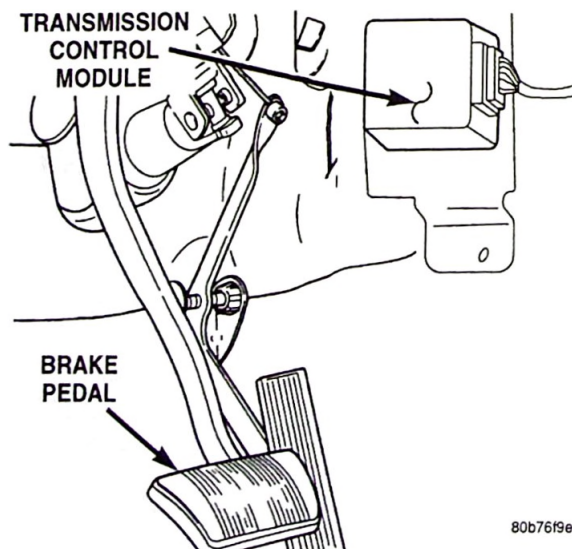
8.4 POWERTRAIN CONTROL MODULE



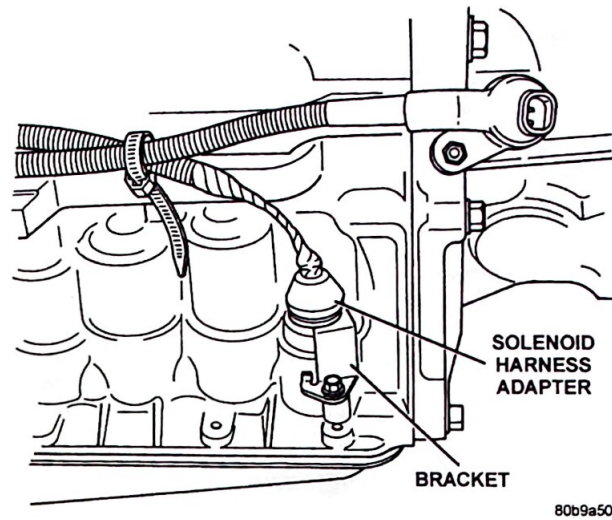
8.5 THROTTLE POSITION SENSOR



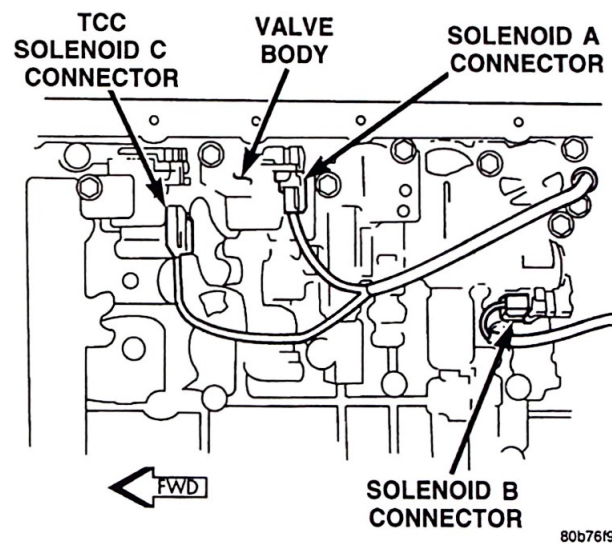
8.6 TRANSMISSION CONTROL MODULE



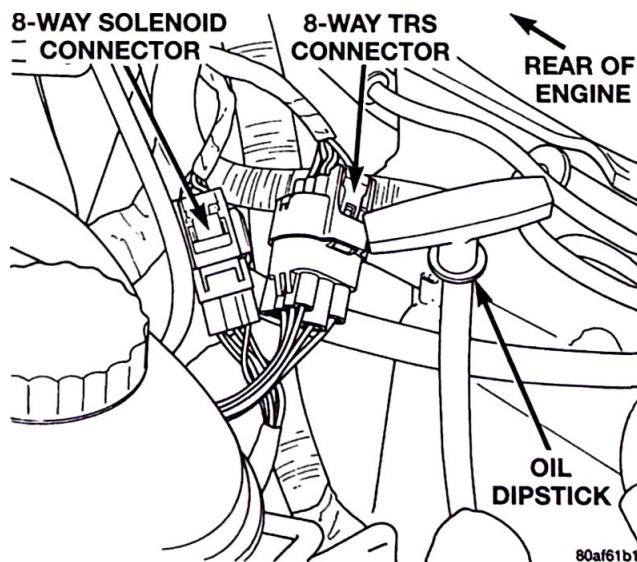
8.7 SOLENOID HARNESS ADAPTER



8.8 SOLENOIDS A, B, C

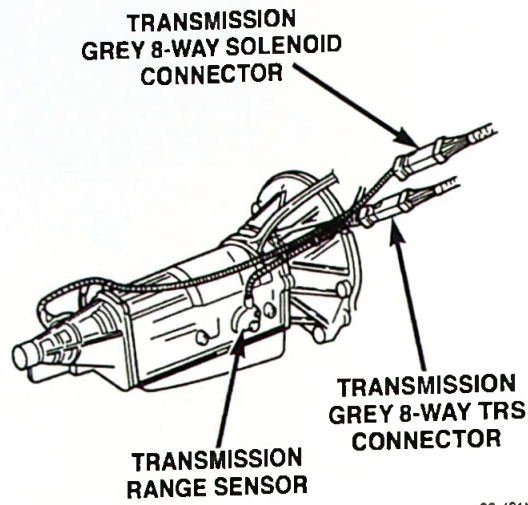


8.9 8-WAY SOLENOID CONNECTOR/8-WAY TRANSMISSION RANGE SENSOR CONNECTOR



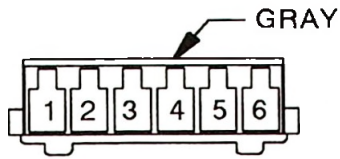
COMPONENT LOCATIONS

8.10 TRANSMISSION RANGE SENSOR/8-WAY HARNESS LOCATION



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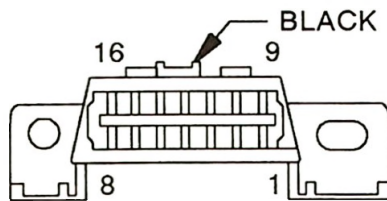
9.0 CONNECTOR PINOUTS



BRAKE LAMP SWITCH

BRAKE LAMP SWITCH - GRAY 6 WAY

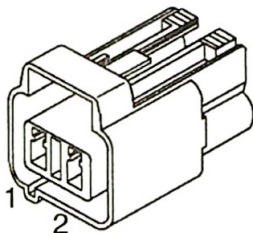
CAV	CIRCUIT	FUNCTION
1	K29 18WT/PK	BRAKE LAMP SWITCH SENSE
2	Z1 18BK	GROUND
3	V32 20YL/RD	SPEED CONTROL ON/OFF SENSE
4	V30 20DB/RD	SPEED CONTROL BRAKE SWITCH OUTPUT
5	L50 20WT/TN	BRAKE LAMP SWITCH OUTPUT
6	F32 20PK/DB	FUSED B(+)



DATA LINK CONNECTOR

DATA LINK CONNECTOR - BLACK 16 WAY

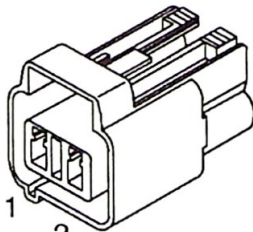
CAV	CIRCUIT	FUNCTION
1	-	-
2	-	-
3	D1 18VT/BR	CCD BUS (+)
4	Z1 18BK	GROUND
5	Z12 18BK/TN	GROUND
6	D20 20LG/BK	SCI RECEIVE
7	D21 20PK	SCI TRANSMIT
8	-	-
9	-	-
10	-	-
11	D2 18WT/BK	CCD BUS (-)
12	-	-
13	-	-
14	-	-
15	-	-
16	F34 18TN/BK	FUSED B(+)



INPUT SPEED SENSOR CONNECTOR

INPUT SPEED SENSOR - 2 WAY

CAV	CIRCUIT	FUNCTION
1	VT/BK	INPUT SPEED SENSOR GROUND
2	BK/RD	INPUT SPEED SENSOR SIGNAL

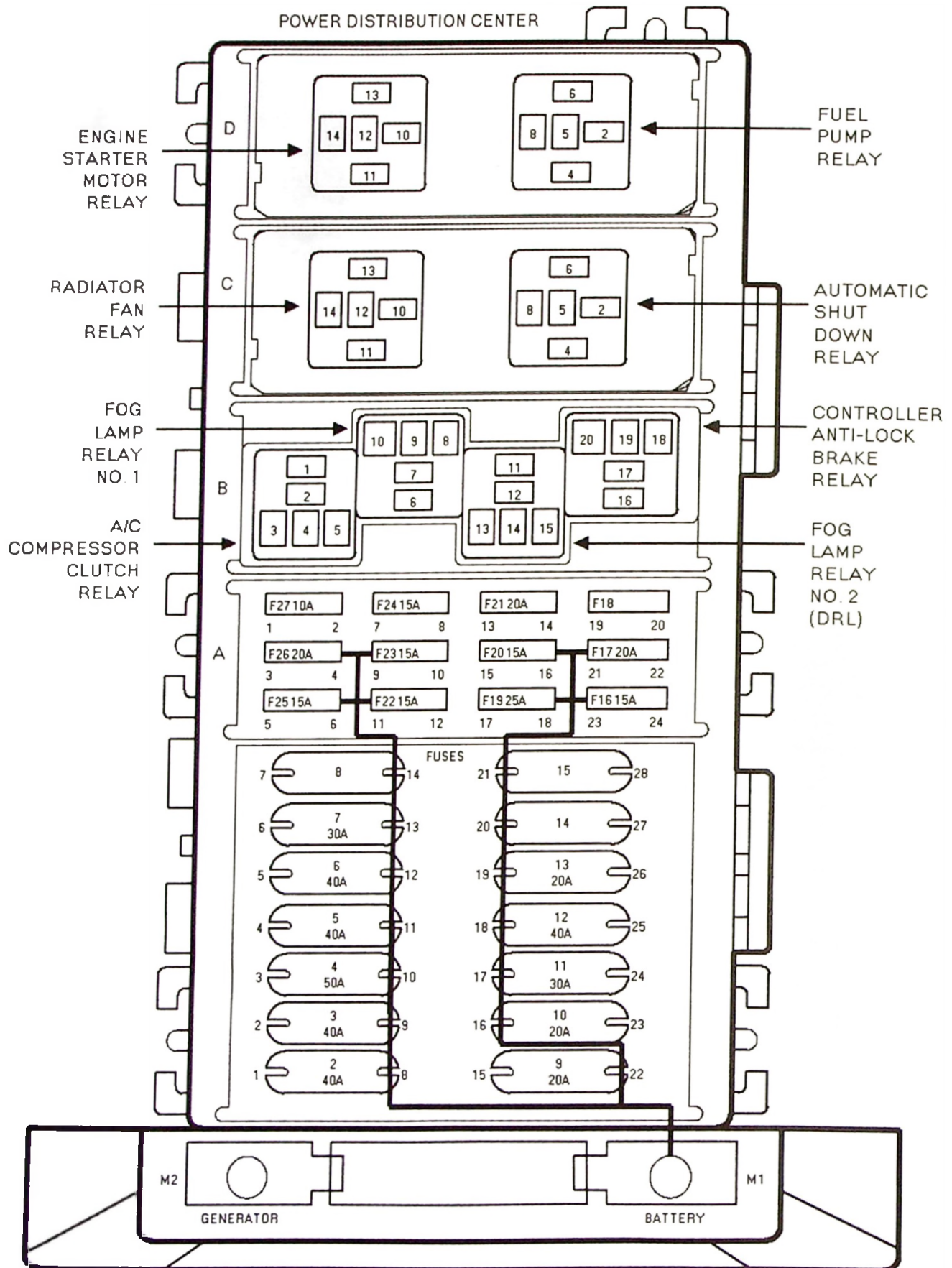


OUTPUT SPEED SENSOR CONNECTOR

OUTPUT SPEED SENSOR - 2 WAY

CAV	CIRCUIT	FUNCTION
1	VT/BK	OUTPUT SPEED SENSOR GROUND
2	BK/RD	OUTPUT SPEED SENSOR SIGNAL

CONNECTOR PINOUTS



CONNECTOR PINOUTS

CONNECTOR PINOUTS

A/C COMPRESSOR CLUTCH RELAY

CAV	CIRCUIT	FUNCTION
B1	A17 16RD/BK	FUSED B(+)
B2	C3 16DB/BK	A/C COMPRESSOR CLUTCH RELAY OUTPUT
B3	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
B4	-	-
B5	F20 18WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)

AUTOMATIC SHUT DOWN RELAY

CAV	CIRCUIT	FUNCTION
C2	A16 16RD/LG	FUSED B(+)
C4	F12 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
C5	-	-
C6	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
C8	A999 16RD	AUTOMATIC SHUT DOWN RELAY OUTPUT
C8	A999 16RD	AUTOMATIC SHUT DOWN RELAY OUTPUT

CONTROLLER ANTI-LOCK BRAKE RELAY

CAV	CIRCUIT	FUNCTION
B16	G19 20LG/OR	ABS WARNING INDICATOR DRIVER
B17	-	-
B18	G83 18GY/BK	ABS RELAY CONTROL
B19	Z1 20BK	GROUND
B20	F15 20DB/WT	FUSED IGNITION SWITCH OUTPUT (RUN)

ENGINE STARTER MOTOR RELAY

CAV	CIRCUIT	FUNCTION
D10	A41 16YL	FUSED B(+)
D11	T41 20BK/WT	PARK/NEUTRAL POSITION SWITCH SENSE
D11	T41 20BK/WT	PARK/NEUTRAL POSITION SWITCH SENSE
D11	Z1 20BK (4.0L M/T)	GROUND
D12	-	-
D13	F45 20YL/RD (LHD 4.0L A/T)	FUSED B(+) ENGINE STARTER MOTOR RELAY
D13	T141 20YL (2.5L, 4.0L M/T, RHD 4.0L A/T)	IGNITION SWITCH OUTPUT (START)
D14	T40 16BR	STARTER RELAY OUTPUT

FOG LAMP RELAY NO. 1

CAV	CIRCUIT	FUNCTION
B6	F61 20WT/OR	FUSED B(+)
B7	L139 20VT	FOG LAMP RELAY OUTPUT
B7	L92 20PK (DRL)	FOG LAMP RELAY OUTPUT
B8	L35 20BR/WT	FOG LAMP RELAY CONTROL
B8	Z1 20BK (DRL)	GROUND
B8	Z1 20BK (DRL)	GROUND
B9	-	-
B10	L77 20BR/YL	FUSED LEFT INBOARD TAIL LAMP
B10	L77 20BR/YL	FUSED LEFT INBOARD TAIL LAMP

FOG LAMP RELAY NO. 2 (DRL)

CAV	CIRCUIT	FUNCTION
B11	L92 20PK	FOG LAMP RELAY OUTPUT
B12	-	-
B13	Z1 20BK	GROUND
B14	L139 20VT	FOG LAMP RELAY OUTPUT
B15	G34 16RD/GY	HIGH BEAM INDICATOR DRIVER
B15	G34 16RD/GY	HIGH BEAM INDICATOR DRIVER

CONNECTOR PINOUTS

CONNECTOR PINOUTS

FUEL PUMP RELAY

CAV	CIRCUIT	FUNCTION
D2	A61 14DG/BK	FUSED B(+)
D2	A61 16DG/BK	FUSED B(+)
D4	F12 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
D6	K31 18BR	FUEL PUMP RELAY CONTROL
D8	A141 14DG/WT	FUEL PUMP RELAY OUTPUT

FUSES

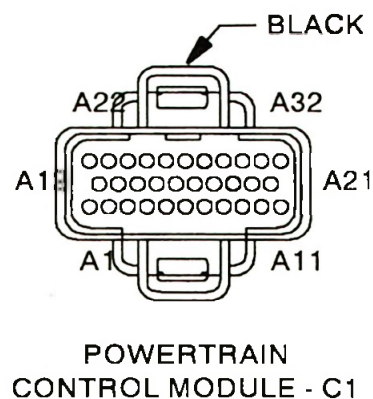
FUSE NO.	AMPS	FUSED CIRCUIT	FEED CIRCUIT
1	40A	-	-
2	40A	A1 12RD	A0 6RD
3	40A	A2 12PK/BK	A0 6RD
4	50A	A7 10RD/BK	A0 6RD
5	40A	F141 12LG/RD	A0 6RD
6	40A	A111 12RD/LG	A0 6RD
7	30A	A3 14RD/WT	A0 6RD
7	30A	A3 14RD/WT (DRL)	A0 6RD
8	-	-	-
9	20A	A17 16RD/BK	A0 6RD
9	20A	A17 16RD/BK	A0 6RD
10	20A	A41 16YL	A0 6RD
11	30A	A4 12BKPK	A0 6RD
12	40A	A10 12RD/DG	A0 6RD
(ABS)			
13	20A	A20 12RD/DB	A0 6RD
(ABS)			
14	-	-	-
15	-	-	-
16	15A	M1 20PK	A0 6RD
17	20A	F34 18TN/BK	A0 6RD
18	-	-	-
19	25A	A16 16RD/LG	A0 6RD
20	15A	L9 20BK/PK	A0 6RD
21	20A	A142 18DG/OR	A999 16RD
22	15A	A61 14DG/BK	A0 6RD
23	15A	F32 20PK/DB	A0 6RD
24	15A	F142 20DG/WT	A999 16RD
25	15A	F51 20WT/OR	A0 6RD
26	20A	F75 16VT	A0 6RD
27	10A	F1 20DB/GY	A17 16RD/BK

RADIATOR FAN RELAY

CAV	CIRCUIT	FUNCTION
C10	F141 12LG/RD	FUSED B(+)
C11	F20 18WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
C12	-	-
C13	C27 18DB/PK	RADIATOR FAN RELAY CONTROL
C14	C25 12LB	RADIATOR FAN RELAY OUTPUT

CONNECTOR PINOUTS

CONNECTOR PINOUTS

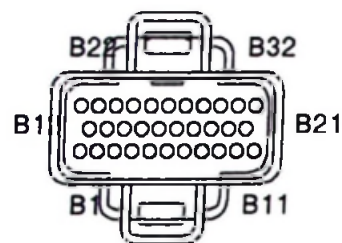


POWERTRAIN CONTROL MODULE C1 - BLACK 32 WAY

CAV	CIRCUIT	FUNCTION
A1	-	-
A2	F12 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)
A3	-	-
A4	K167 18BR/YL	SENSOR RETURN
A5	-	-
A6	T41 18BK/WT (2.5L A/T)	PARK/NEUTRAL POSITION SWITCH SENSE
A6	T41 18BK/WT (4.0L A/T)	TRANSMISSION RANGE SWITCH SENSE
A6	Z1 18BK	GROUND
A7	K19 18GY	IGNITION COIL NO. 1 DRIVER
A8	K24 18GY/BK	CRANKSHAFT POSITION SENSOR SIGNAL
A9	-	-
A10	K60 18YL/BK	IDLE AIR CONTROL NO. 2 DRIVER
A11	K40 18BR/WT	IDLE AIR CONTROL NO. 3 DRIVER
A12	K10 18DB/BR (2.5L)	POWER STEERING PRESSURE SENSE
A12	K78 18GY (4.0L A/T)	IDLE ACTUATOR
A13	-	-
A14	-	-
A15	K21 18BK/RD	INTAKE AIR TEMPERATURE SENSOR SIGNAL
A16	K2 18TN/BK	ENGINE COOLANT TEMPERATURE SENSOR SIGNAL
A17	K7 18OR	5 VOLT SUPPLY
A18	K44 18TN/YL	CAMSHAFT POSITION SENSOR SIGNAL
A19	K39 18GY/RD	IDLE AIR CONTROL NO.1 DRIVER
A20	K59 18VT/BK	IDLE AIR CONTROL NO.1 DRIVER
A21	-	-
A22	A61 16DG/BK	FUSED B(+)
A23	K22 18OR/DG	THROTTLE POSITION SENSOR SIGNAL
A24	K41 18BK/DG	UPSTREAM HEATED OXYGEN SENSOR
A25	K141 18TN/WT	DOWNSTREAM HEATED OXYGEN SENSOR
A26	-	-
A27	K1 18DG/RD	MANIFOLD ABSOLUTE PRESSURE SENSOR SIGNAL
A28	-	-
A29	-	-
A30	-	-
A31	Z12 14BK/TN	GROUND
A32	Z12 14BK/TN	GROUND

CONNECTOR PINOUTS

CONNECTOR PINOUTS



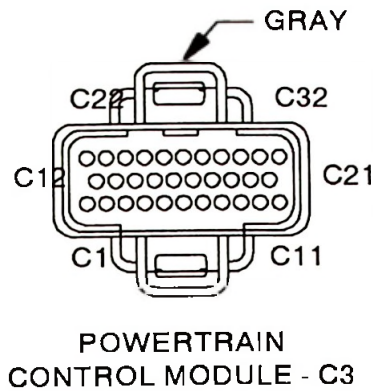
POWERTRAIN
CONTROL MODULE - C2

POWERTRAIN CONTROL MODULE C2 - WHITE 32 WAY

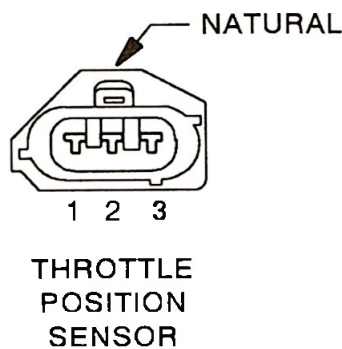
CAV	CIRCUIT	FUNCTION
B1	-	-
B2	-	-
B3	-	-
B4	K11 18WT/DB	FUEL INJECTOR NO. 1 DRIVER
B5	K13 18YL/WT	FUEL INJECTOR NO. 3 DRIVER
B6	K15 18PK/BK	FUEL INJECTOR NO. 5 DRIVER
B7	-	-
B8	-	-
B9	-	-
B10	K20 18DG	GENERATOR FIELD DRIVER
B11	K54 18OR/BK (2.5L A-3)	-
B12	K16 18LG/BK (4.0I/O)	FUEL INJECTOR NO. 6 DRIVER
B13	K54 18OR/BK (2.5L)	TORQUE CONVERTER CLUTCH SOLENOID CONTROL
B14	-	-
B15	K12 18TN	FUEL INJECTOR NO. 2 DRIVER
B16	K14 18LB/BR	FUEL INJECTOR NO. 4 DRIVER
B17	-	-
B18	-	-
B19	-	-
B20	-	-
B21	-	-
B22	-	-
B23	G60 18GY/YL	ENGINE OIL PRESSURE SENSOR SIGNAL
B24	-	-
B25	-	-
B26	-	-
B27	G7 18WT/OR	VEHICLE SPEED SENSOR SIGNAL
B28	-	-
B29	-	-
B30	-	-
B31	K6 18VT/OR	5 VOLT SUPPLY
B32	-	-

CONNECTOR PINOUTS

CONNECTOR PINOUTS



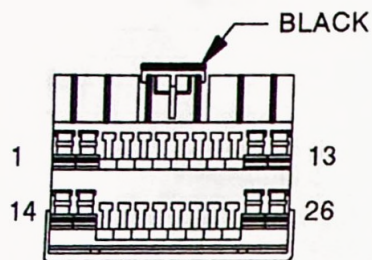
POWERTRAIN CONTROL MODULE C3 - GRAY 32 WAY		
CAV	CIRCUIT	FUNCTION
C1	C13 18DB/OR	A/C COMPRESSOR CLUTCH RELAY CONTROL
C2	C27 18DB/PK	RADIATOR FAN RELAY CONTROL
C3	K51 18DB/YL	AUTOMATIC SHUT DOWN RELAY CONTROL
C4	V36 18TN/RD	SPEED CONTROL VACUUM SOLENOID CONTROL
C5	V35 18LG/RD	SPEED CONTROL VENT SOLENOID CONTROL
C6	-	-
C7	-	-
C8	-	-
C9	-	-
C10	K106 18WT/DG (4.0L)	LEAK DETECTION PUMP SOLENOID CONTROL
C11	V32 18YL/RD	SPEED CONTROL POWER SUPPLY
C12	A142 18DG/OR	AUTOMATIC SHUT DOWN RELAY OUTPUT
C13	-	-
C14	K105 18OR	BATTERY TEMPERATURE SENSOR SIGNAL
C15	K188 18PK/YL (4.0L)	LEAK DETECTION PUMP SWITCH SENSE
C16	-	-
C17	-	-
C18	-	-
C19	K31 18BR	FUEL PUMP RELAY CONTROL
C20	K52 18PK/BK	EVAPORATIVE EMISSION SOLENOID CONTROL
C21	-	-
C22	C22 18DB/WT	A/C SWITCH SENSE
C23	C90 18LG	A/C SELECT INPUT
C24	K29 18WT/PK	BRAKE SWITCH SENSE
C25	K72 18DG/OR	GENERATOR DRIVER
C26	K226 18DB/LG	FUEL PUMP RELAY CONTROL
C27	D21 18PK	SCI TRANSMIT
C28	D2 18WT/BK	CCD BUS (-)
C29	D20 18LG/BK	SCI RECEIVE
C30	D1 18VT/BR	CCD BUS (+)
C31	-	-
C32	V37 18RD/LG	SPEED CONTROL SWITCH SIGNAL



THROTTLE POSITION SENSOR - NATURAL 3 WAY		
CAV	CIRCUIT	FUNCTION
1	K167 20BR/YL	SENSOR RETURN
2	K22 18OR/DB (2.5L)	THROTTLE POSITION SENSOR SIGNAL
2	K22 20OR/DB (4.0L)	THROTTLE POSITION SENSOR SIGNAL
3	K7 20OR	5 VOLT SUPPLY

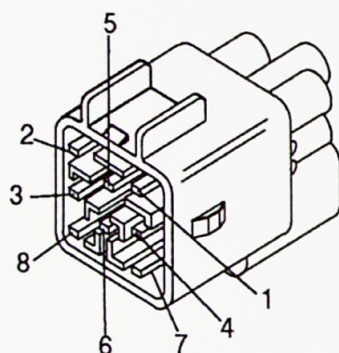
CONNECTOR PINOUTS

CONNECTOR PINOUTS



TRANSMISSION
CONTROL MODULE

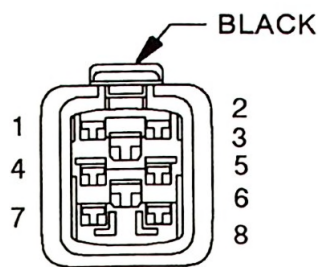
TRANSMISSION CONTROL MODULE - BLACK 26 WAY		
CAV	CIRCUIT	FUNCTION
1	T31 20VT/LG	INPUT SPEED SENSOR GROUND
2	T52 20RD/BK	INPUT SPEED SENSOR SIGNAL
3	T13 20DB/BK	OUTPUT SPEED SENSOR GROUND
4	T14 20LG/WT	OUTPUT SPEED SENSOR SIGNAL
5	-	-
6	D2 20WT/BK	CCD BUS (-)
7	D1 20VT/BR	CCD BUS (+)
8	-	-
9	T3 18VT	TRS T3 SENSE
10	-	-
11	T22 20DB/WT	SOLENOID C CONTROL
12	T19 20WT	SOLENOID A CONTROL
13	T60 20OR/WT	SOLENOID B CONTROL
14	D21 20PK	SCI TRANSMIT
15	-	-
16	K167 20BR/YL	SENSOR RETURN
17	K22 20OR/DB	THROTTLE POSITION SENSOR SIGNAL
18	L10 18BR/LG	BACK UP LAMP FEED
19	-	-
20	-	-
21	T42 18VT/WT	TRS T42 SENSE
22	T1 18LG/BK	TRS T1 SENSE
23	K29 20WT/PK	BRAKE SWITCH SENSE
24	Z12 18BK/TN	GROUND
25	M1 20PK	FUSED B(+)
26	F12 18DB/WT	FUSED IGNITION SWITCH OUTPUT (ST-RUN)



TRANSMISSION
RANGE SENSOR
CONNECTOR
(TRANS HARNESS SIDE)

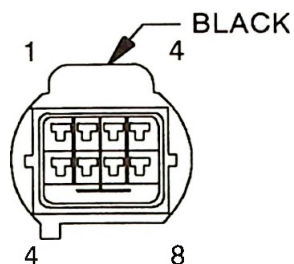
TRANSMISSION RANGE SENSOR (TRANS SIDE) - 8 WAY		
CAV	CIRCUIT	FUNCTION
1	VT/WT	TRS T42 SENSE
2	VT	TRS T3 SENSE
3	WT	FUSED IGNITION SWITCH OUTPUT (START-RUN)
4	LG/BK	TRS T1 SENSE
5	-	-
6	BR/LG	BACK-UP LAMPS
7	BK/WT	TRS T41 SENSE
8	BK	GROUND

CONNECTOR PINOUTS



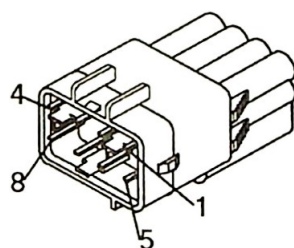
TRANSMISSION
RANGE SENSOR
(4.0L A/T)

TRANSMISSION RANGE SENSOR - BLACK 8 WAY		
CAV	CIRCUIT	FUNCTION
1	T42 18VT/WT	TRS T42 SENSE
2	T3 18VT	TRS T3 SENSE
3	F20 18WT	FUSED IGNITION SWITCH OUTPUT (START-RUN)
4	T1 18LG/BK	TRS T1 SENSE
5	-	-
6	L10 18BR/LG	BACK-UP LAMPS
7	T41 20BK/WT	TRS T41 SENSE
8	Z1 18BK	GROUND



TRANSMISSION
SOLENOID

TRANSMISSION SOLENOID - BLACK 8 WAY		
CAV	CIRCUIT	FUNCTION
1	T52 20RD/BK	INPUT SPEED SENSOR SIGNAL
2	T60 20OR/WT	TRANSMISSION SOLENOID A
3	T19 20WT	TRANSMISSION SOLENOID B
4	T22 20DB/WT	TRANSMISSION SOLENOID C (LOCK-UP)
5	T31 20VT/LG	INPUT SPEED SENSOR GROUND
6	T13 20DB/BK	OUTPUT SPEED SENSOR GROUND
7	T14 20LG/WT	OUTPUT SPEED SENSOR SIGNAL
8	-	-



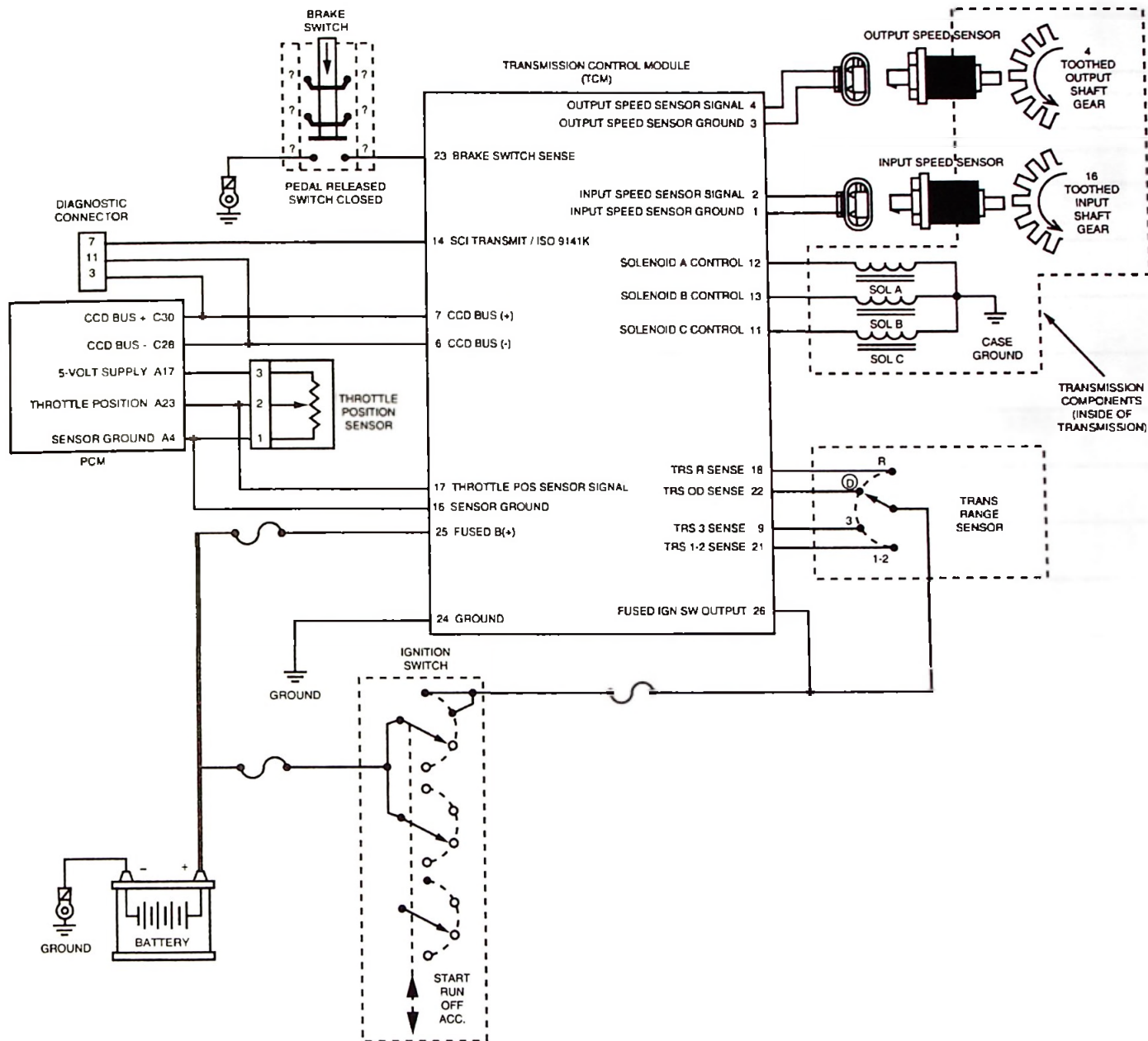
TRANSMISSION
SOLENOID
(TRANS SIDE)

TRANSMISSION SOLENOID (TRANS SIDE) - 8 WAY		
CAV	CIRCUIT	FUNCTION
1	RD/BK	INPUT SPEED SENSOR SIGNAL
2	OR/WT	TRANSMISSION SOLENOID A
3	WT	TRANSMISSION SOLENOID B
4	DB/WT	TRANSMISSION SOLENOID C (LOCK-UP)
5	VT/LG	INPUT SPEED SENSOR GROUND
6	DB/BK	OUTPUT SPEED SENSOR GROUND
7	LG/WT	OUTPUT SPEED SENSOR SIGNAL
8	-	-

NOTES

CONNECTOR PINS

10.0 SCHEMATICS



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NOTES

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Diagnostic Procedure _____ Book No. _____ Page _____

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